# 2022 Missouri Standard Plans for Highway Construction

# Missouri Department of Transportation

This set of standard plans has been approved by the Missouri Highways and Transportation Commission for highway construction projects and constitutes a contract document in accordance with Section 101.2 of the Standard Specifications for Highway Construction.

This set of Standard Plans is effective beginning with the July 2042 bid opening.

www.modot.org/business/standards\_and\_specs/standardplans.htm

# MISSOURI HIGHWAYS AND TRANSPORATION COMMISSION

# MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION

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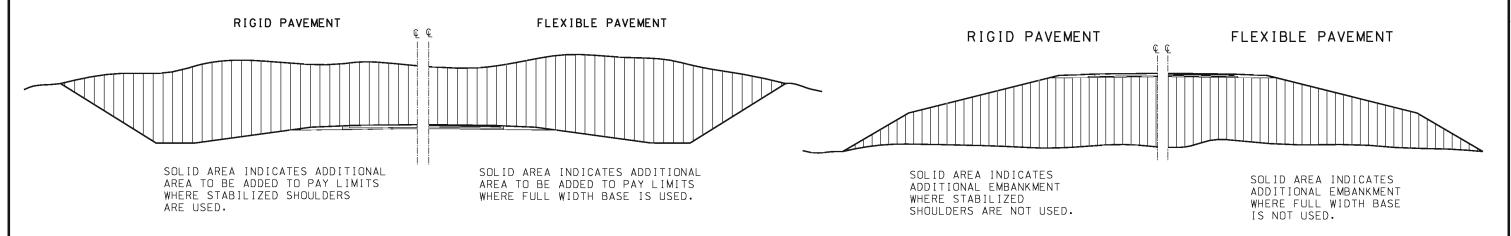
# MISSOURI HIGHWAYS AND TRANSPORATION COMMISSION

# MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION

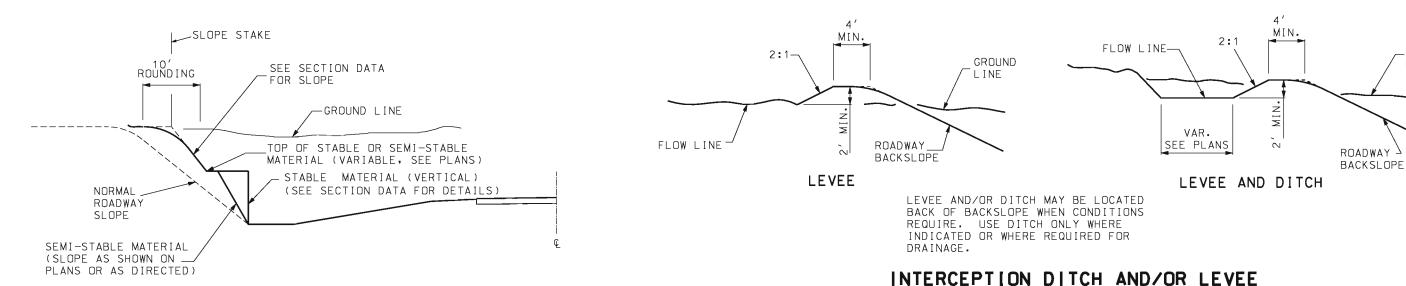
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732.10H	SAFETY SLOPE END SECTION	3	01/01/2021
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806.10J	TEMPORARY EROSION CONTROL MEASURES	6	04/01/2019
808.00	TYPICAL PLANTING ILLUSTRATIONS	3	07/01/2004
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CONTEN	15	T.	
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902.30P	TRAFFIC SIGNALS – POST BASES	2	10/01/2018
902.40R	TRAFFIC SIGNALS – TUBULAR STEEL POSTS	3	04/01/2018
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902.70Q	TRAFFIC SIGNALS – RIGID SPAN WIRE DETAILS	3	01/01/2022
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903.03BP	POST INSTALLATION AND SIGN MOUNTING DETAILS  *	16	07/01/2022
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903.06K	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE S, TWO TUBE	2	01/01/2021
903.07K	HIGHWAY SIGNING – TUBULAR SUPPORT STEEL – TYPE C	2	01/01/2021
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903.60AC	OVERHEAD SIGN TRUSSES – STRUCTURAL STEEL	5	01/01/2021

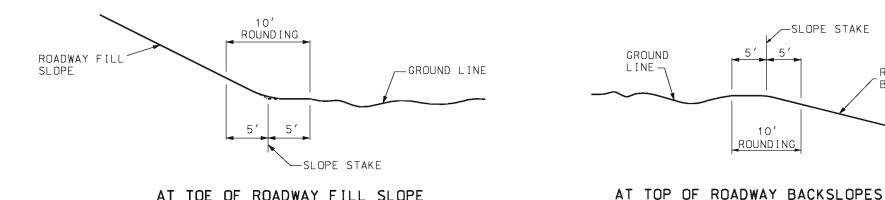


## **EXCAVATION PAY LIMITS**



# BACKSLOPES IN STABLE AND SEMI-STABLE MATERIAL

AT TOE OF ROADWAY FILL SLOPE



PARABOLIC ROUNDING

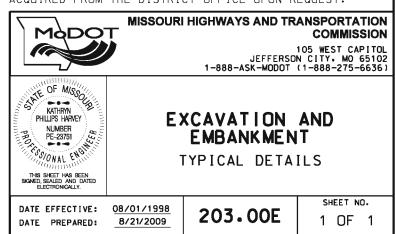
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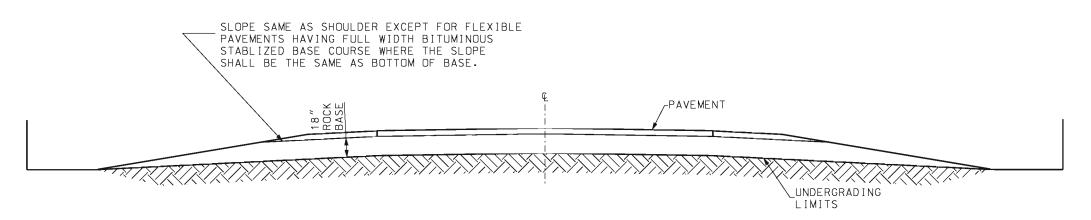
ROADWAY BACKSLOPE EMBANKMENT LIMITS

SUBSURFACE LOGS OF MATERIALS OBTAINED DURING THE SOIL SURVEY FOR THE PURPOSE OF CUT CLASSIFICATION MAY BE ACQUIRED FROM THE DISTRICT OFFICE UPON REQUEST.

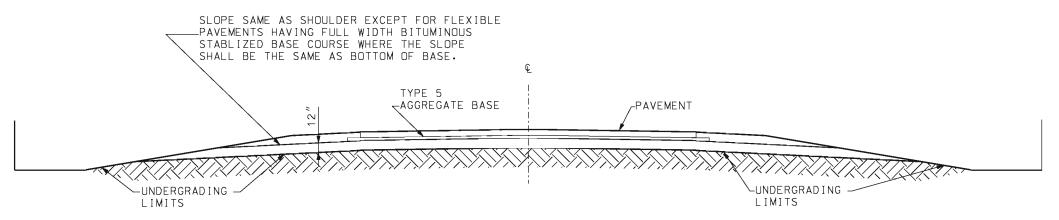
GROUND

LINE

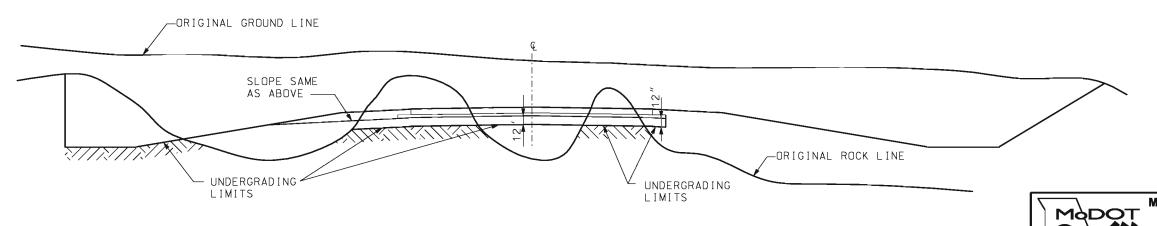




## IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH 18" ROCK BASE



# IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH TYPE 5 AGGREGATE BASE



# IN ROCK OVER PARTIAL WIDTH OF ROADBED

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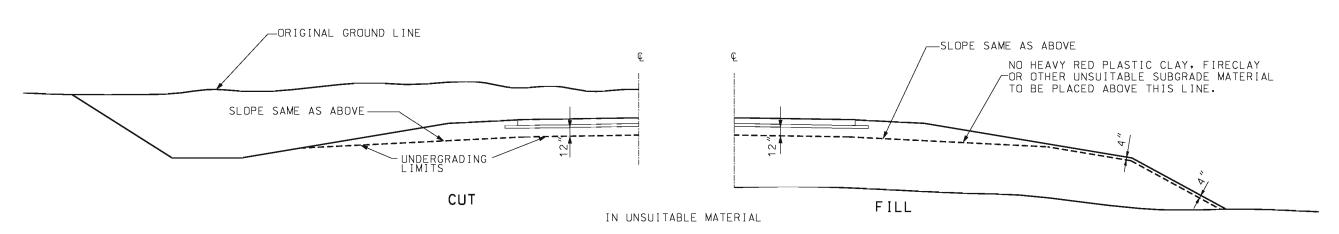


UNDERGRADING

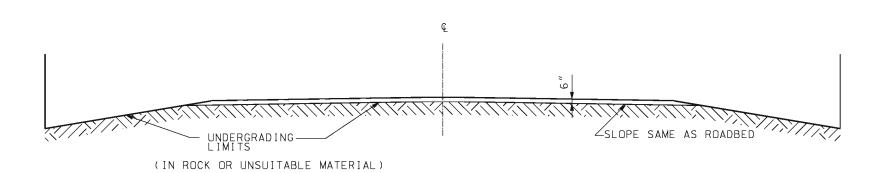
TYPICAL DETAILS

DATE EFFECTIVE: 01/01/2004 DATE PREPARED:

203.02F



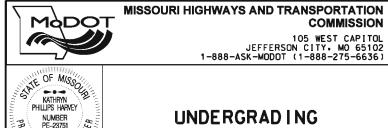
# UNDERGRADING LIMITS (FLEXIBLE OR RIGID PAVEMENTS)



#### UNDERGRADING LIMITS

(EARTH OR AGGREGATE TYPE SURFACE)

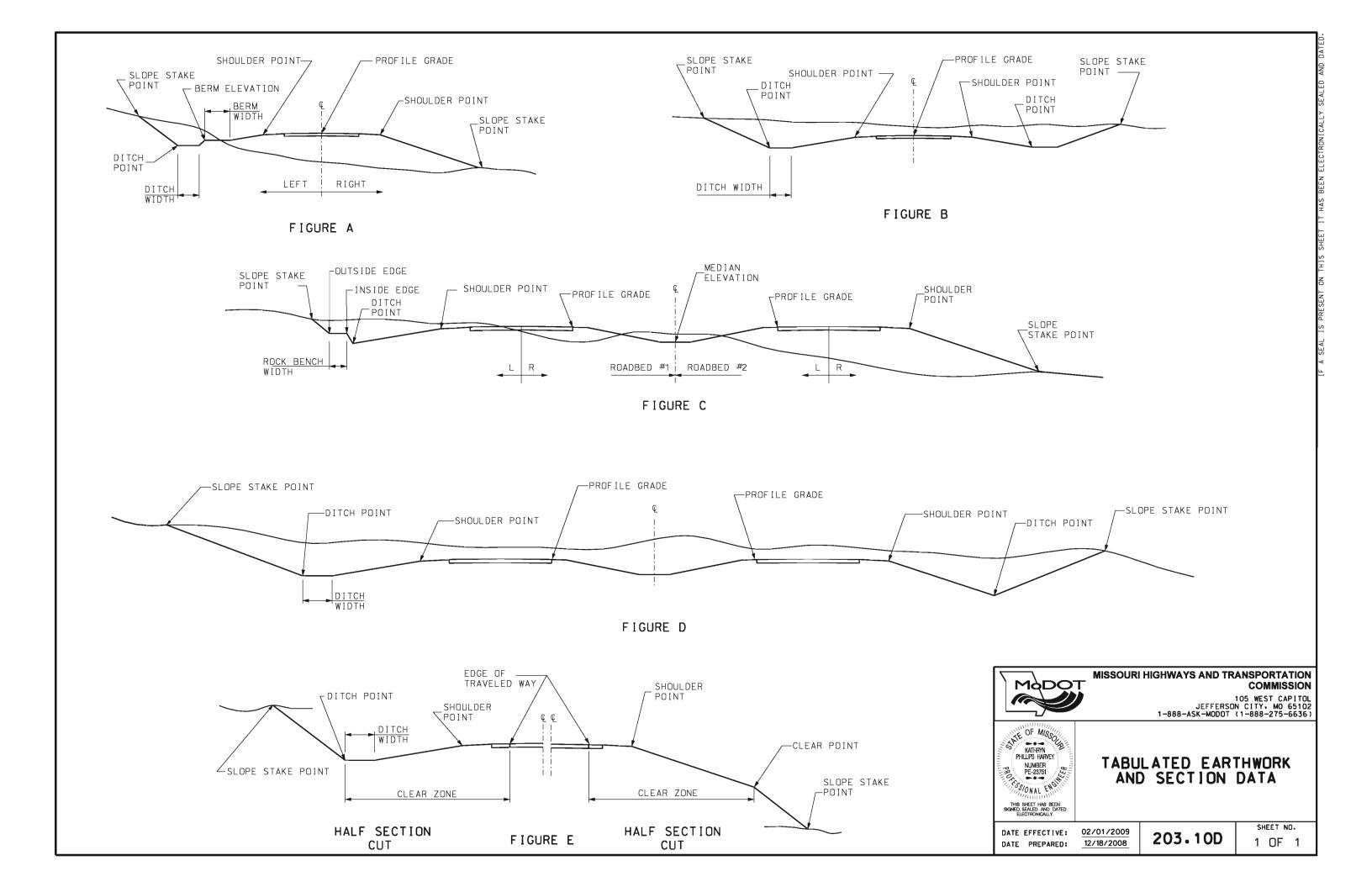
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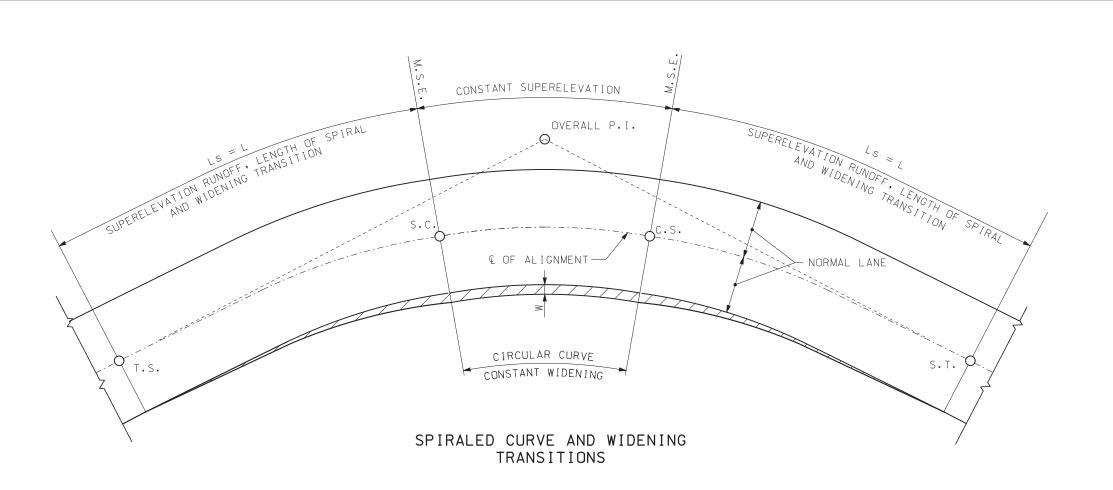


NUMBER PE-23751 TYPICAL DETAILS

DATE EFFECTIVE: 01/01/2004 DATE PREPARED:

203.02F





#### MULTILANE FACTORS FOR "L"

1.0 LANE ROTATED (2 LANE ROADBED) = 1.00 1.5 LANE ROTATED (3 LANE ROADBED) = 1.25 2.0 LANE ROTATED (4 LANE ROADBED) = 1.50 2.5 LANE ROTATED (5 LANE ROADBED) = 1.75 3.0 LANE ROTATED (6 LANE ROADBED) = 2.00 3.5 LANE ROTATED (7 LANE ROADBED) = 2.25

MAXIMUM RADIUS SPIRAL CURVE	
DESIGN SPEED	MAXIMUM RADIUS (FT)
30	456
35	620
40	810
45	1025
50	1265
55	1531
60	1822
65	2138
70	2479

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.

#### GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDERS, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.



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SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS

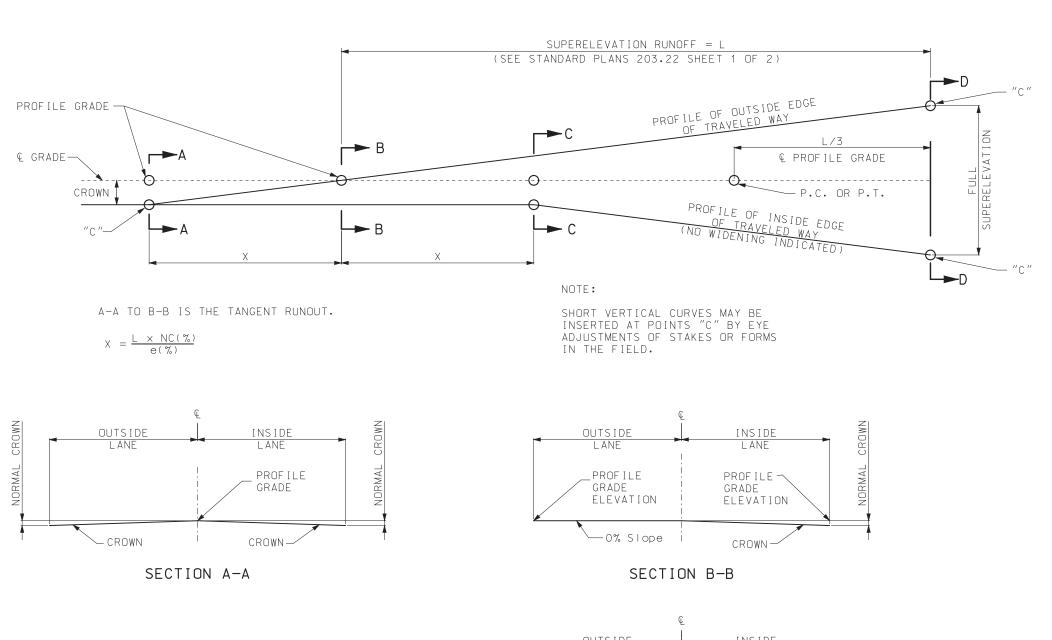
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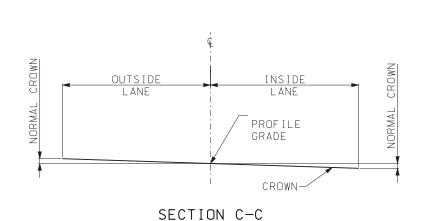
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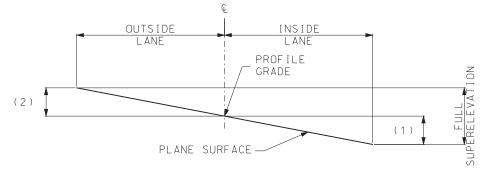
203.20G

SHEET NO. 1 OF 4

CONSTANT SUPERELEVATION . O. P. I. € OF ALIGNMENT NORMAL LANE O. P.T. CONSTANT WIDENING SUPERELEVATION RUNOFF AND WIDENING TRANSITIONS WITHOUT SPIRALS







- (1) FULL S.E. FOR  $\frac{1}{2}$  PAVEMENT WIDTH IF GREATER THAN CROWN SLOPE.
- (2) FULL S.E. FOR \(\frac{1}{2}\) PAVEMENT WIDTH.

#### SECTION D-D

#### CASE NUMBER 1

(WHERE HIGH POINT OF TRAVELED WAY IS AT CENTERLINE ON TANGENT SECTION)
NOTE: USE FOR 2 LANE TRAFFIC ROADS ONLY. PAVEMENT REVOLVED ABOUT ITS Q.



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SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS

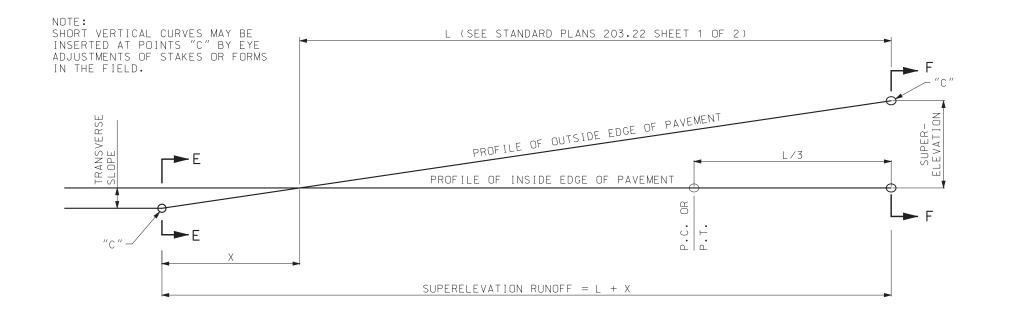
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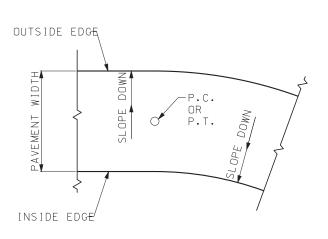
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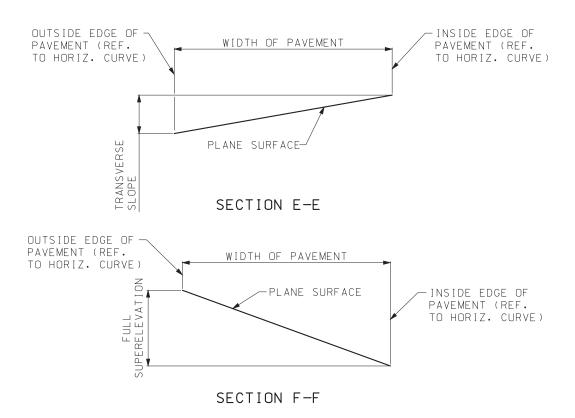
SHEET NO.

2 OF 4





PLAN OF ALIGNMENT FOR CASE NUMBER 2



#### CASE NUMBER 2

(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS OPPOSITE TO SLOPE OF SUPERELEVATION)
NOTE: PAVEMENT REVOLVED ABOUT ITS INSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

# STRAIGHT LINE METHODS OF ATTAINING SUPERELEVATION



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

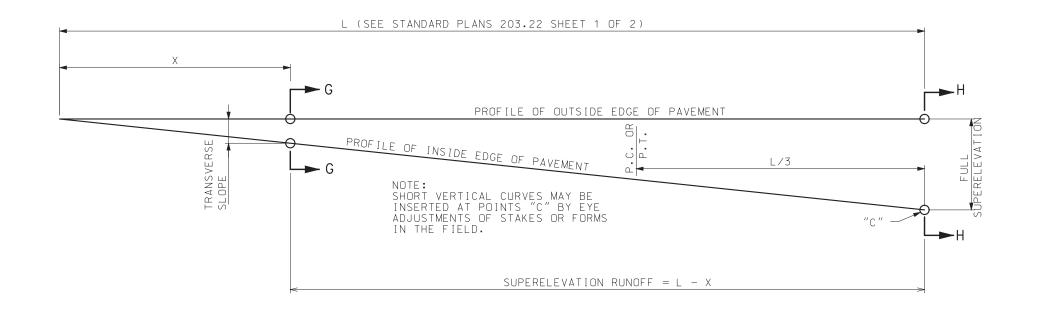
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

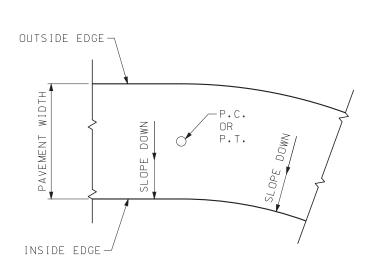


SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS

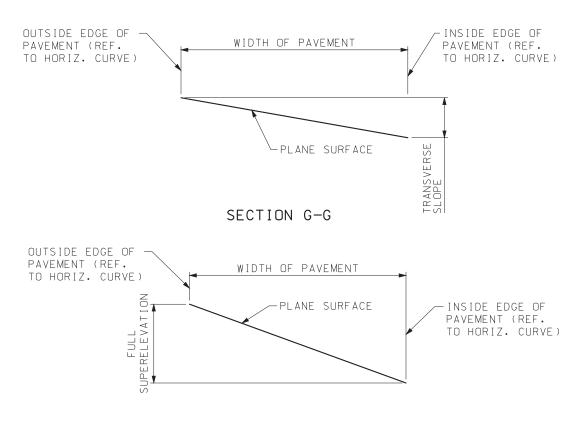
DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

203.20G





PLAN OF ALIGNMENT FOR CASE NUMBER 3



SECTION H-H

#### CASE NUMBER 3

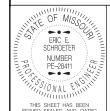
(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS SAME DIRECTION AS SLOPE OF SUPERELEVATION) NOTE: PAVEMENT REVOLVED ABOUT ITS OUTSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

## STRAIGHT LINE METHOD OF ATTAINING SUPERELEVATION



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

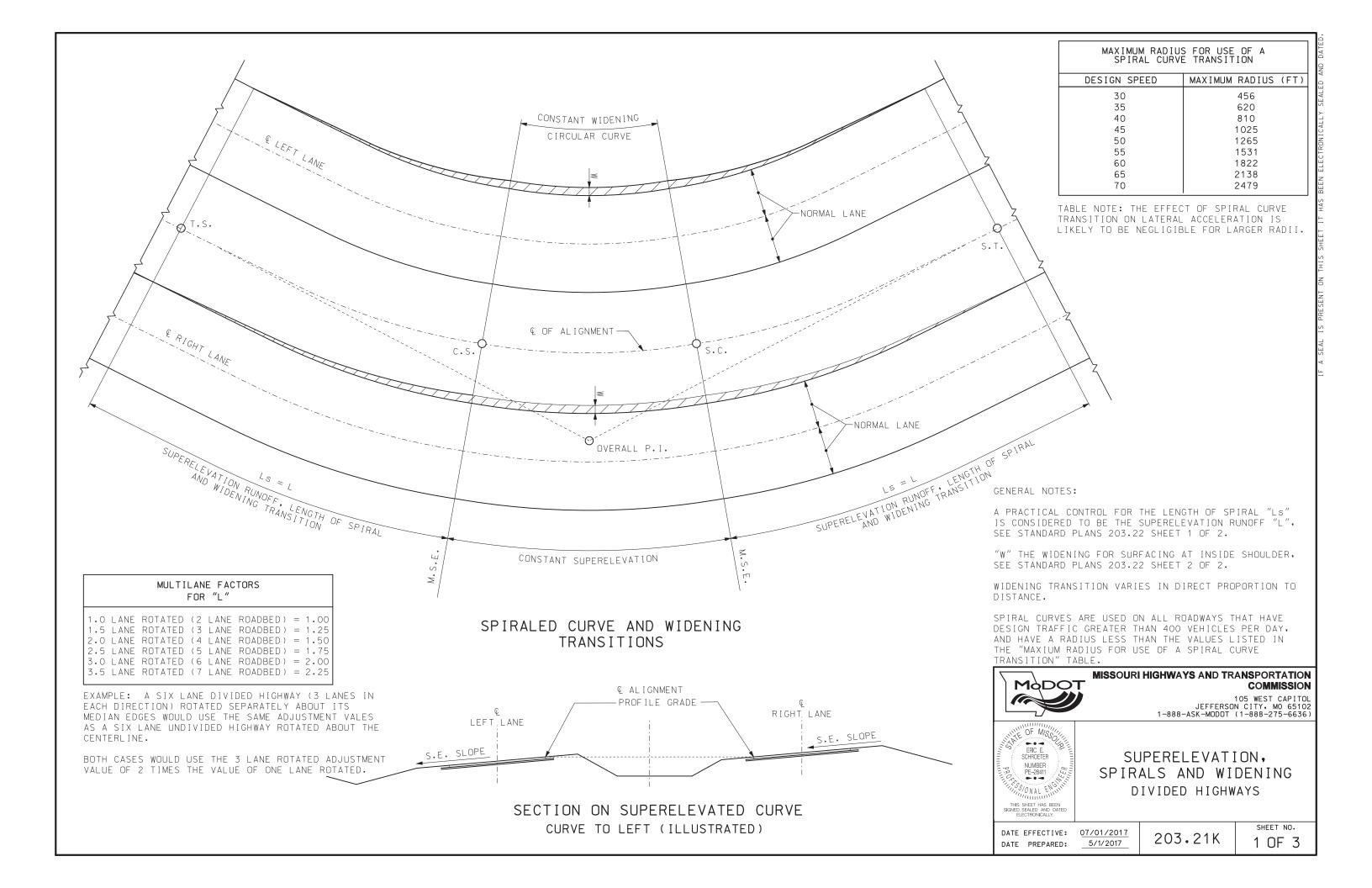


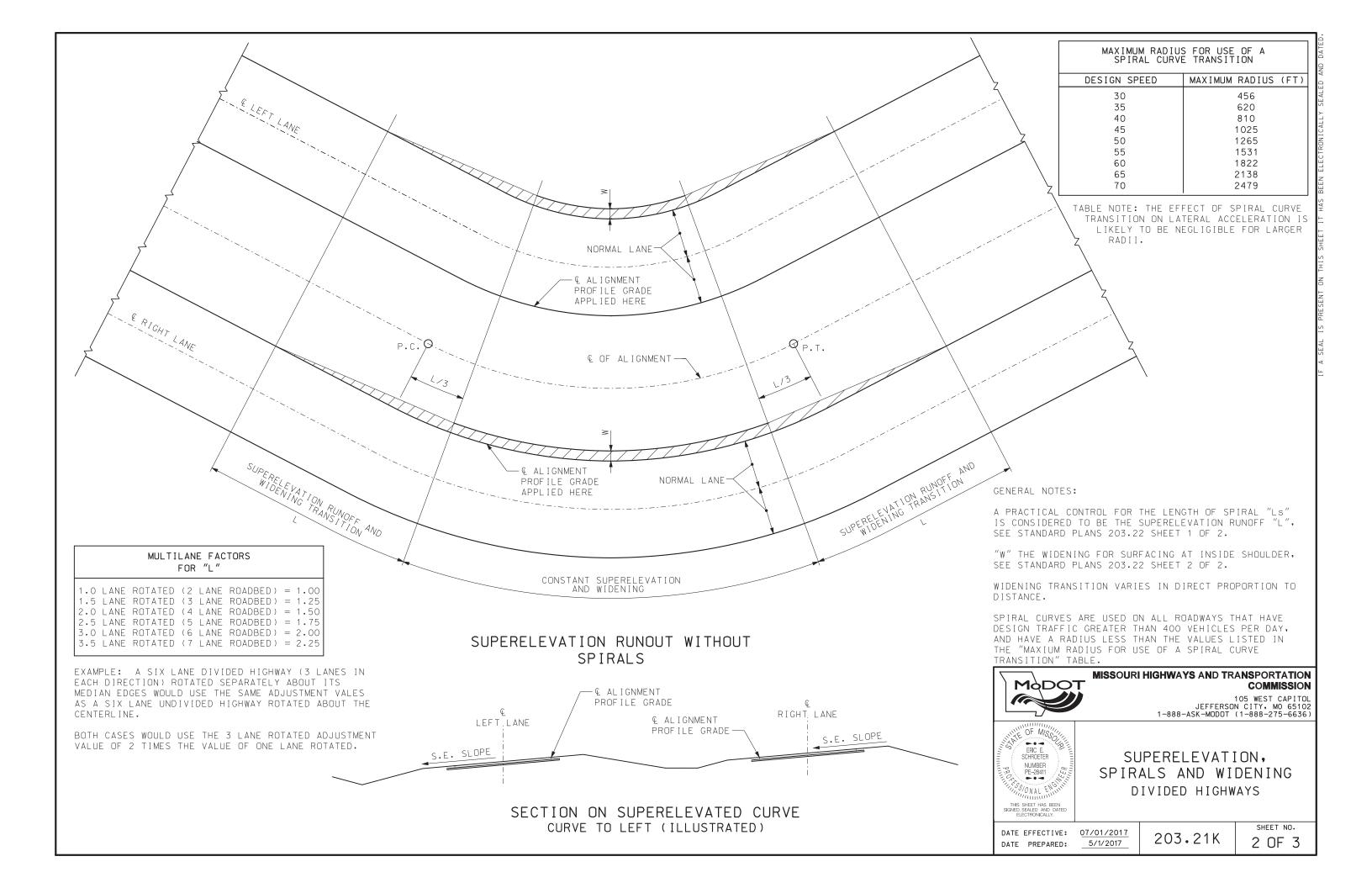
SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS

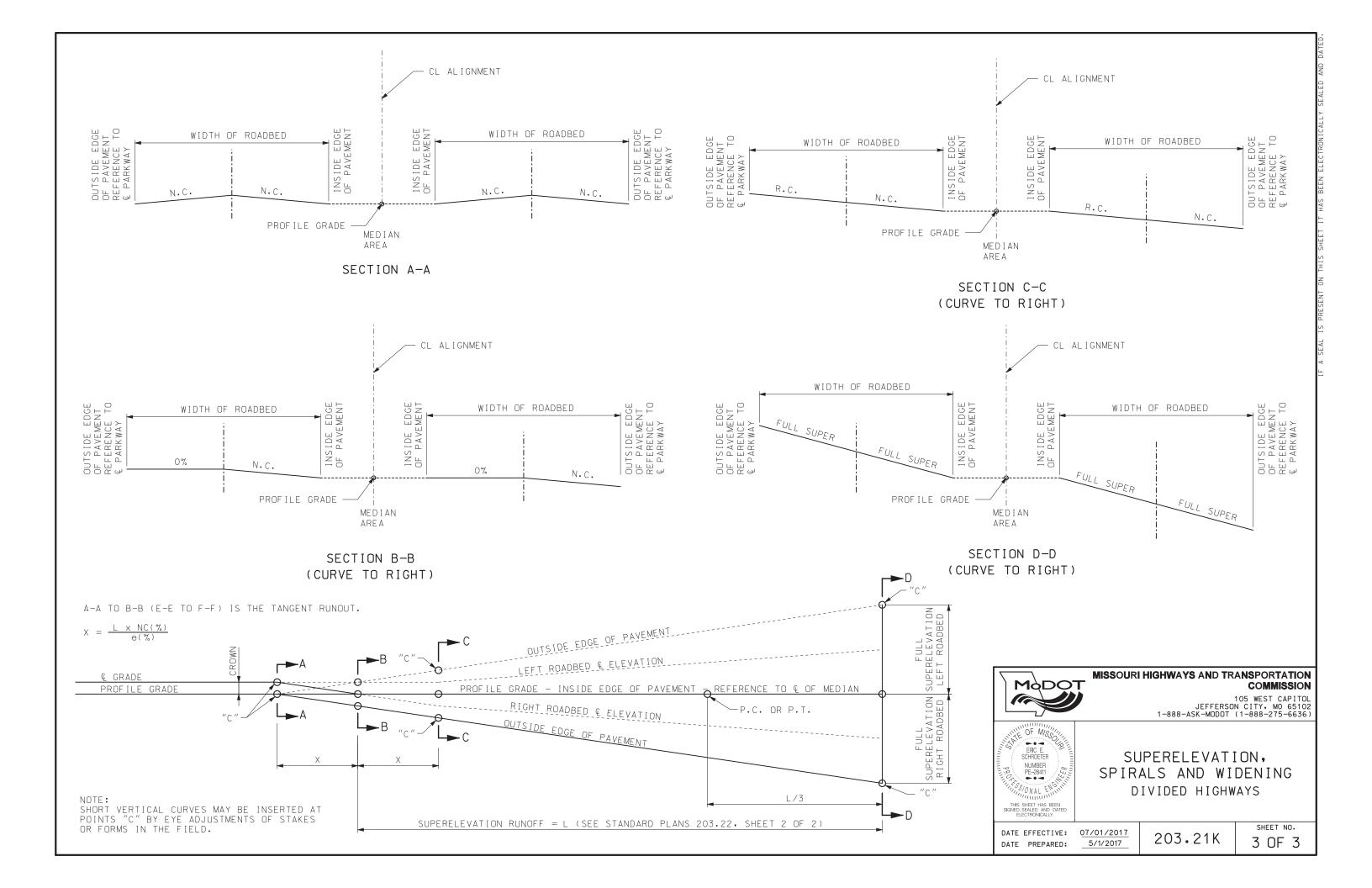
DATE PREPARED: 5/1/2017

DATE EFFECTIVE: 07/01/2017

203.20G







	MINIMUM RADII FOR DESIGN SUPERELEVATION RATES, DESIGN SPEEDS, AND $e_{\text{max}} = 4\%$																				
	DESIGN SPEED (MPH)																				
e%	30			35			40			45			5	0		5	55		60		
	RADIUS	L1	L2	RADIUS	IUS L1 L2		RADIUS	L1	L2	RADIUS	L1 L2		RADIUS L1 L2		RADIUS	L1	L2	RADIUS	L1	L2	
NC	2,830	0	0	3,730	0	0	4,770	0	0	5,930	0	0	7,220	0	0	8,650	0	0	10,300	0	0
RC	1,880	36	55	2,490	39	58	3,220	41	62	4,040	44	67	4'940	48	72	5,950	51	77	7,080	53	80
2.2	1,580	40	60	2,120	43	64	2,760	46	58	3,480	49	73	4,280	53	79	5,180	56	84	6,190	59	88
2.4	1,270	44	65	1,760	46	70	2,340	50	74	2,980	53	80	3,690	58	86	4,500	61	92	5,410	64	96
2.6	1,000	47	71	1,420	50	75	1,930	54	81	2,490	58	87	3,130	62	94	3,870	66	100	4,700	69	104
2.8	817	51	76	1,170	54	81	1,620	58	87	2,100	62	93	2,660	67	101	3,310	71	107	4,060	75	112
3.0	681	55	82	982	58	87	1,370	62	93	1,800	67	100	2,290	72	108	2,860	77	115	3,530	80	120
3.2	576	58	87	835	62	93	1,180	66	99	1,550	71	107	1,980	77	115	2,490	82	123	3,090	85	128
3.4	490	62	93	714	66	99	1,010	70	106	1,340	76	113	1,720	82	122	2,170	87	130	2,700	91	136
3.6	416	65	98	610	70	105	865	74	112	1,150	80	120	1,480	86	130	1,880	92	138	2,350	96	144
3.8	348	69	104	512	74	110	730	79	118	970	84	127	1,260	91	137	1,600	97	146	2,010	101	152
4.0	250	73	109	371	77	116	533	83	124	711	89	133	926	96	144	1,190	102	153	1,500	107	160

	MINIMUM RADII FOR DESIGN SUPERELEVATION RATES, DESIGN SPEEDS, AND e <sub>max</sub> = 8%																										
											ESIGN SF	H )															
е%	3	30		3	35		4	10		4	15		50			τ,	55		(	60		65			70		
	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2	RADIUS	L1	L2
NC	3,240	0	0	4,260	0	0	5,410	0	0	6,710	0	0	8,150	0	0	9,720	0	0	11,500	0	0	12,900	0	0	14,500	0	0
RC	2,370	36	55	3,120	39	58	3,970	41	62	4,930	44	67	5,990	48	72	7,150	51	77	8,440	53	80	9,510	56	84	10,700	60	90
2.2	2,130	40	60	2,800	43	64	3,570	46	58	4,440	49	73	5,400	53	79	6,450	56	84	7,620	59	88	8,600	61	92	9,660	66	99
2.4	1,930	44	65	2,540	46	70	3,240	50	74	4,030	53	80	4,910	58	86	5,870	61	92	6,930	64	96	7,830	67	100	8,810	72	108
2.6	1,760	47	71	2,320	50	75	2,960	54	81	3,690	58	87	4,490	62	94	5,370	66	100	6,350	69	104	7,180	73	109	8,090	78	117
2.8	1,610	51	76	2,130	54	81	2,720	58	87	3,390	62	93	4,130	67	101	4,950	71	107	5,850	75	112	6,630	78	117	7,470	84	126
3.0	1,480	55	82	1,960	58	87	2,510	62	93	3,130	67	100	3,820	72	108	4,580	77		5,420	80	120	6,140	84	126	6,930	90	135
3.2	1,370	58	87	1,820	62	93	2,330	66	99	2,900	71	107	3,550	77	115	4,250	82	123	5,040	85	128	5,720	89	134	6,460	96	144
3.4	1,270	62	93	1,690	66	99	2,170	70	106	2,700	76	113	3,300	82	122	3,970	87	130	4,700	91	136	5,350	95	142	6,050	102	153
3.6	1,180	65	98	1,570	70	105	2,020	74	112	2,520	80	120	3,090	86	130	3,710	92	138	4,400	96	144	5,010	100	151	5,680	108	162
3.8	1,100	69	104	1,470	74	110	1,890	79	118	2,360	84	127	2,890	91	137	3,480	97	146	4,140	101	152	4,700	106	159	5,350	114	171
4.0	1,030	73	109	1,370	77	116	1,770	83	124	2,220	89	133	2,720	96	144	3,270	102	153	3,890	107	160	4,450	112	167	5,050	120	180
4.2	955	76	115	1,280	81	122	1,660	87	130	2,080	93	140	2,560	101	151	3,080	107	161	3,670	_	168	4,200	117	176	4,780	126	
4.4	893	80	120	1,200	85	128	1,560		137	1,960	98	147	2,410		158	2,910	_	169	3,470	_	176	3,980		184	4,540	132	
4.6	834	84	125	1,130	89	134	1,470		143	1,850	102		2,280		166	2,750	_	176	3,290	_	184	3,770		193		138	
4.8	779	87	131	1,060	93	139	1,390		149	1,750	107		2,160		173	2,610	_	184	3,120	_	192	3,590		201	4,100	144	
5.0	727	91	136	991	97	145	1,310	103	155	1,650	111	167	2,040	120		2,470	128	191	2,960	133	200	3,410	140	209	3,910	150	225
5.2	676	95	142	929	101	151	1,230	108	161	1,560	116	173	1,930	125	187	2,350		199	2,820	138	208	3,250	145	218	3,740	156	234
5.4	627	98	147	870	105	157	1,160	112	168	1,480	120	180	1,830	130	194	2,230	138	207	2,680	144	216	3,110	151	226	3,570	162	243
5.6	582	102	153	813	108	163	1,090	116	174	1,390	124	187	1,740	134	202	2,120	143	214	2,550	149	224	2,970	156	234	3,420	168	252
5.8	542	105	158	761	112	168	1,030	120	180	1,320	129	193	1,650	139	209	2,010	148	222	2,430	155	232	2,840	162	243	3,280	174	261
6.0	506	109	164	713	116	174	965	124	186	1,250	133	200	1,560	144	216	1,920	153	230	2,320	160	240	2,710	167	251	3,150	180	270
6.2	472	113	169	669	120	180	909	128	192	1,180	138	207	1,480	149	223	1,820	158	237	2,210	165	248	2,600	173	260	3,020	186	279
6.4	442	116	175	628	124	186	857	132	199	1,110	142	213	1,400	154	230	1,730	163	245	2,110	171	256	2,490	179	268	2,910	192	288
6.6	413	120	180	590	128	192	808	137	205	1,050	147	220	1,330	158	238	1,650	169	253	2,010	176	264	2,380	184	276	2,790	198	297
6.8	386	124	185	553	132	197	761	141	211	990	151	227	1,260	163	245	1,560	174	260	1,910	181	272	2,280	190	285	2,690	204	306
7.0	360	127	191	518	135	203	716	145	217	933	156	233	1,190	168	252	1,480	179	268	1,820	187	280	2,180	195	293	2,580	210	315
7.2	336	131	196	485	139	209	672	149	223	878	160	240	1,120	173	259	1,400	184	276	1,720	192	288	2,070	201	301	2,470	216	324
7.4	312	135	202	451	143	215	628	153		822	164	247	1,060	178	266	1,320	189	283	1,630	197	296	1,970	207	310	2,350	222	333
7.6	287	138	207	417	147	221	583	157	236	765	169	253	980	182	274	1,230	194	291	1,530	203	304	1,850	212	318	2,230	228	342
7.8	261	142	213	380	151	226	533	161	242	701	173	260	901	187	281	1,140	199	299	1,410	208	312	1,720	218	327	2,090	234	351
8.0	214	145	218	314	155	232	444	166	248	587	178	267	758	192	288	960	204	306	1,200	213	320	1,480	223	335	1,810	240	360

TABLE NOTES:

"NC" DENOTES NORMAL CROSS SLOPE.

"RC" DENOTES REMOVE ADVERSE CROSS SLOPE, SUPERELEVATE AT NORMAL CROSS SLOPE.

"e" DENOTES THE SUPERELEVATION IN PERCENT (%).

"L" THE LENGTH OF SUPERELEVATION RUNOFF AND WIDENING TRANSITION IN FEET FOR A 2 LANE ROADWAY.

THE L1 COLUMN IS FOR 1 LANE ROTATED THE L2 COLUMN IS FOR 2 LANES ROTATED

1 LANE ROTATED IS TYPICALLY FOR A 2-LANE HIGHWAY 2 LANE ROTATED IS TYPICALLY FOR A 4-LANE HIGHWAY

WHEN USING ONE OF THE TABLES FOR A GIVEN RADIUS, INTERPOLATION IS NOT NECESSARY AS THE SUPERELEVATION RATE SHOULD BE DETERMINED FROM A RADIUS EQUAL TO, OR SLIGHTLY SMALLER THAN, THE REDII PROVIDED IN THE TABLE. THE RESULT IS A SUPERELEVATION RATE THAT IS ROUNDED UP TO THE NEAREST 0.2 OF A PERCENT.

EXAMPLE: A 50 MPH CURVE WITH A MAXIMUM SUPERELEVATION RATE OF 8 PERCENT, AND A RADIUS OF 1,910 FT, SHOULD USE THE RADIUS OF 1,830 FT TO OBTAIN A SUPERELEVATION RATE OF 5.4 PERCENT.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SUPERELEVATION, SPIRALS AND WIDENING

DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018

203.22

CALCULATED AND DESIGN VALUES FOR TRAVELED WAY WIDENING ON OPEN HIGHWAY CURVES (TWOLANE HIGHWAYS, ONE-WAY OR TWO-WAY)[WB-67 ADJUSTMENT] 24' ROADWAY WIDTH 22' ROADWAY WIDTH 20' ROADWAY WIDTH CURVE RADIUS DESIGN SPEED (MPH) DESIGN SPEED (MPH) DESIGN SPEED (MPH) (FT) 30 | 35 | 40 | 45 | 50 | 55 | 60 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 30 | 35 | 40 | 45 | 50 | 55 | 60 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.8 0.8 0.9 0.9 1.0 1.1 1.1 1.8 1.8 1.9 1.9 2.0 2.1 2.1  $|\hspace{.06cm}0.1\hspace{.05cm}|\hspace{.06cm}0.1\hspace{.05cm}|\hspace{.06cm}0.1\hspace{.05cm}|\hspace{.06cm}0.1\hspace{.05cm}|\hspace{.06cm}0.2\hspace{.05cm}|\hspace{.06cm}0.8\hspace{.05cm}|\hspace{.06cm}0.9\hspace{.05cm}|\hspace{.06cm}1.0\hspace{.05cm}|\hspace{.06cm}1.1\hspace{.05cm}|\hspace{.06cm}1.2\hspace{.05cm}|\hspace{.06cm}1.2\hspace{.05cm}|\hspace{.06cm}1.8\hspace{.05cm}|\hspace{.06cm}1.9\hspace{.05cm}|\hspace{.06cm}2.0\hspace{.05cm}|\hspace{.06cm}2.1\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}2.2\hspace{.05cm}|\hspace{.06cm}2.2\hspace{.05cm}2.2\hspace{.0cm}2.2\hspace{.05cm}2.2\hspace{.$  $|\hspace{.06cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}1.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}1.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}1.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.1\hspace{.08cm}|\hspace{.08cm}0.$ 0.1 0.1 0.1 0.2 0.2 0.3 0.5 1.0 1.0 1.1 1.2 1.2 1.3 1.4 2.0 2.0 2.1 2.2 2.2 2.3 2.5 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.6 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.4 | 1.5 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.6 0.1 0.2 0.3 0.3 0.4 0.5 0.7 1.1 | 1.2 | 1.3 | 1.3 | 1.4 | 1.5 | 1.6 | 2.1 | 2.2 | 2.3 | 2.3 | 2.4 | 2.5 | 2.7 3500 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.6 | 0.8 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.6 | 1.7 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.8 | 3000 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.4 | 1.5 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.4 | 2.5 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 2500 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.7 | 2.8 | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 2000 | 0.9 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.9 | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 3.6 | 1.1 | 1.2 | 1.3 | 1.5 | 1.6 | 1.7 | 1.8 | 2.1 | 2.2 | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 3.1 | 3.2 | 3.3 | 3.5 | 3.6 | 3.7 | 3.8 1.3 | 1.4 | 1.5 | 1.7 | 1.8 | 1.9 | 2.0 | 2.3 | 2.4 | 2.5 | 2.7 | 2.8 | 2.9 | 3.0 | 3.3 | 3.4 | 3.5 | 3.7 | 3.8 | 3.9 | 4.0 1400 1.6 | 1.8 | 1.9 | 2.0 | 2.2 | 2.3 | 2.4 | 2.6 | 2.8 | 2.9 | 3.0 | 3.2 | 3.3 | 3.4 | 3.6 | 3.8 | 3.9 | 4.0 | 4.4 | 4.3 | 4.4 2.0 | 2.1 | 2.2 | 2.4 | 2.5 | 2.7 | 2.8 | 3.0 | 3.1 | 3.2 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.2 | 4.4 | 4.5 | 4.7 | 4.8 1000 2.5 | 2.7 | 2.8 | 3.0 | 3.1 | 3.3 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.4 | 4.5 | 4.7 | 4.8 | 5.0 | 5.1 | 5.3 | 5.4 2.8 | 3.0 | 3.1 | 3.3 | 3.5 | 3.6 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 | 4.6 4.8 | 5.0 | 5.1 | 5.3 | 5.5 | 5.6 | 3.2 3.4 3.6 3.8 4.0 4.1 4.2 | 4.4 | 4.6 | 4.8 | 5.0 | 5.1 5.2 | 5.4 | 5.6 | 5.8 | 6.0 | 6.1 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8 6.0 6.2 6.4 6.6 4.5 4.7 4.9 5.1 5.3 5.5 5.7 5.9 6.1 6.3 6.5 6.7 6.9 7.1 7.3 5.4 5.7 5.9 6.1 6.4 6.7 6.9 7.1 7.4 7.7 7.9 8.1 450 6.1 6.3 6.6 7.1 7.3 7.6 8.1 8.3 8.6 400 6.9 7.1 7.4 7.9 | 8.1 | 8.4 8.9 9.1 9.4 350 7.9 8.1 8.4 8.9 9.1 9.4 9.9 10.1 10.4 9.2 9.5 300 10.2 10.5 11.2 11.5 250 11.2 12.2 13.2 200 | 14.0 15.0 16.0

#### TABLE NOTES:

"W" THE WIDENING IN FEET FOR SURFACING AT INSIDE SHOULDERS.

VALUES SHOWN ARE FOR WB-67 DESIGN VEHICLE AND REPRESENT WIDENING IN FEET.

VALUES LESS THAN 2.0 FEET MAY BE DISREGARDED.

FOR 3-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 1.5.

FOR 4-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 2.0.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



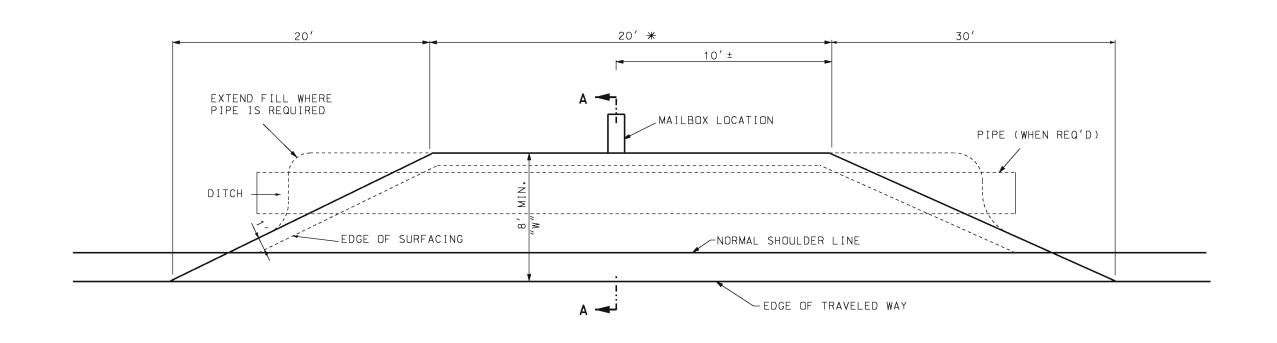
SUPERELEVATION, SPIRALS AND WIDENING

DATE EFFECTIVE: 07/01/2017 DATE PREPARED:

5/1/2017

SHEET NO. 203.22

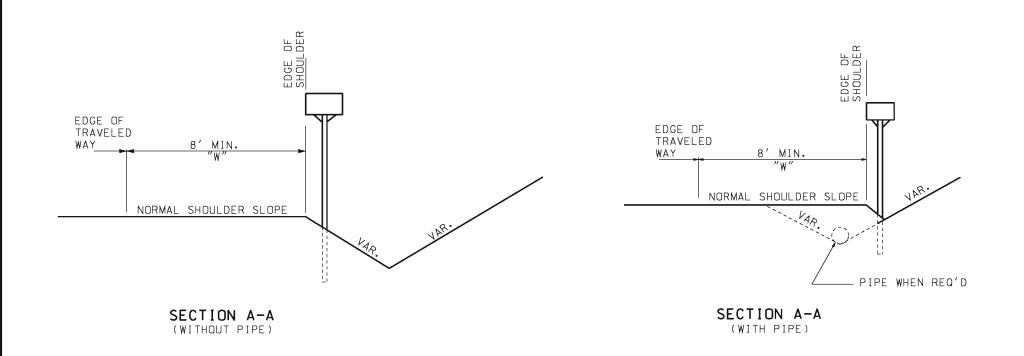
2 OF 2



\* ADD 2' FOR EACH ADDITIONAL MAILBOX

€ PAVEMENT

#### PLAN



GENERAL NOTES:

IN NO CASE WILL "W" BE LESS THAN SHOULDER WIDTH.
"W" WILL BE 8' UNLESS OTHERWISE NOTED ON THE PLANS.

WHEN ENTRANCES ARE ADJACENT TO MAILBOX TURNOUTS.
THE AREA AND SURFACING OF THE ENTRANCE MAY BE USED FOR A PORTION OF THE MAILBOX TURNOUT.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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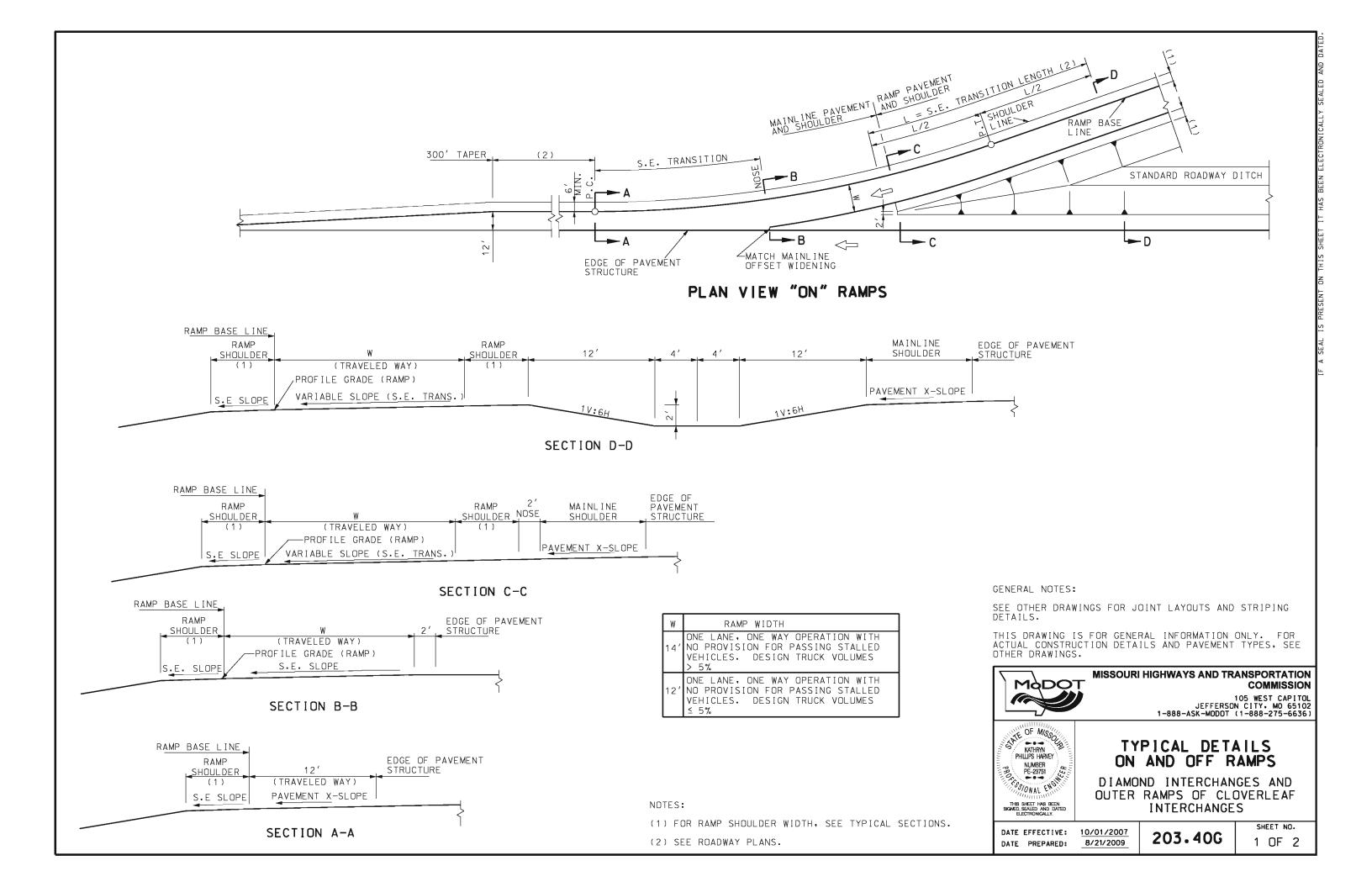


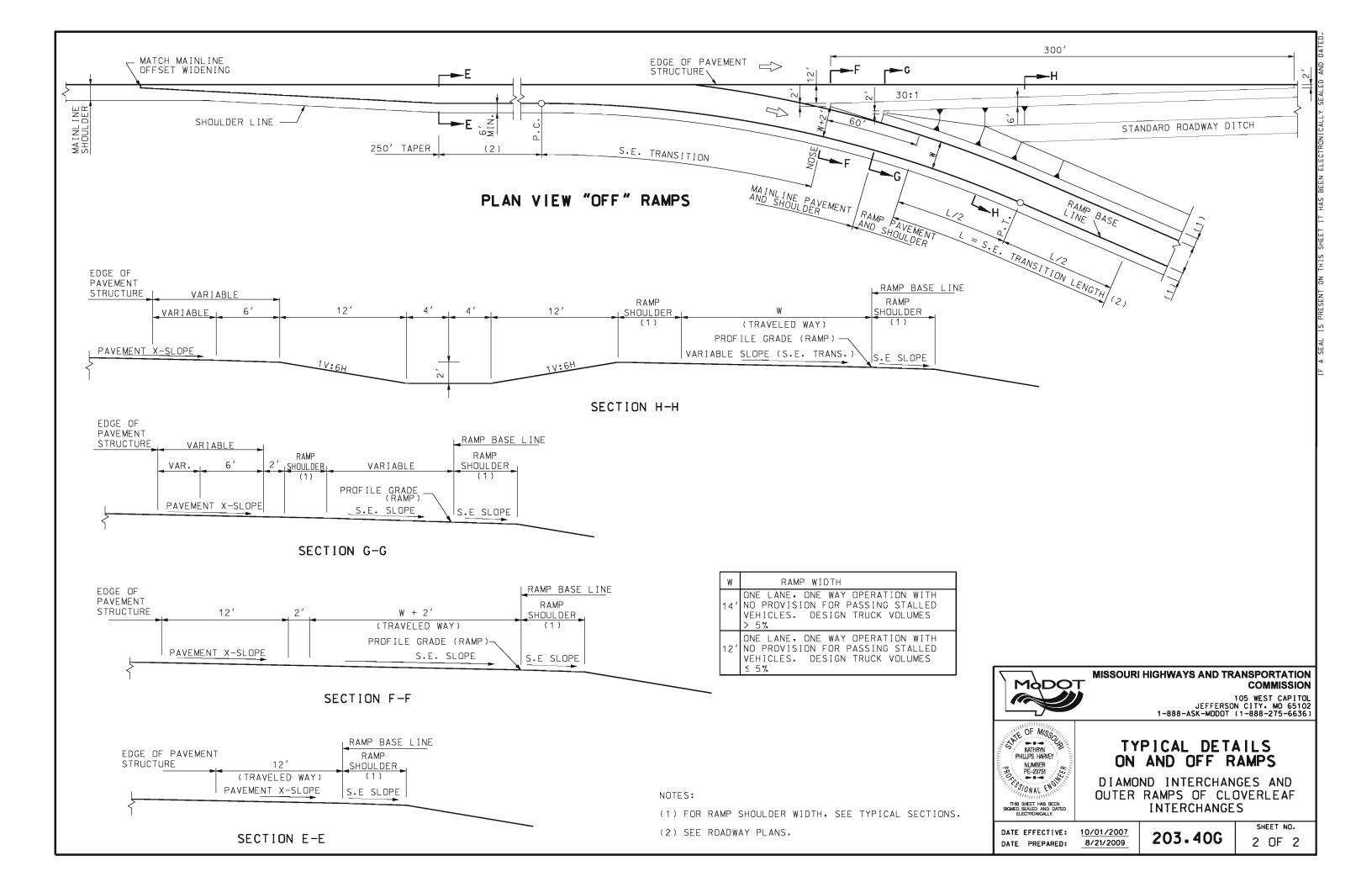
## MAILBOX TURNOUTS

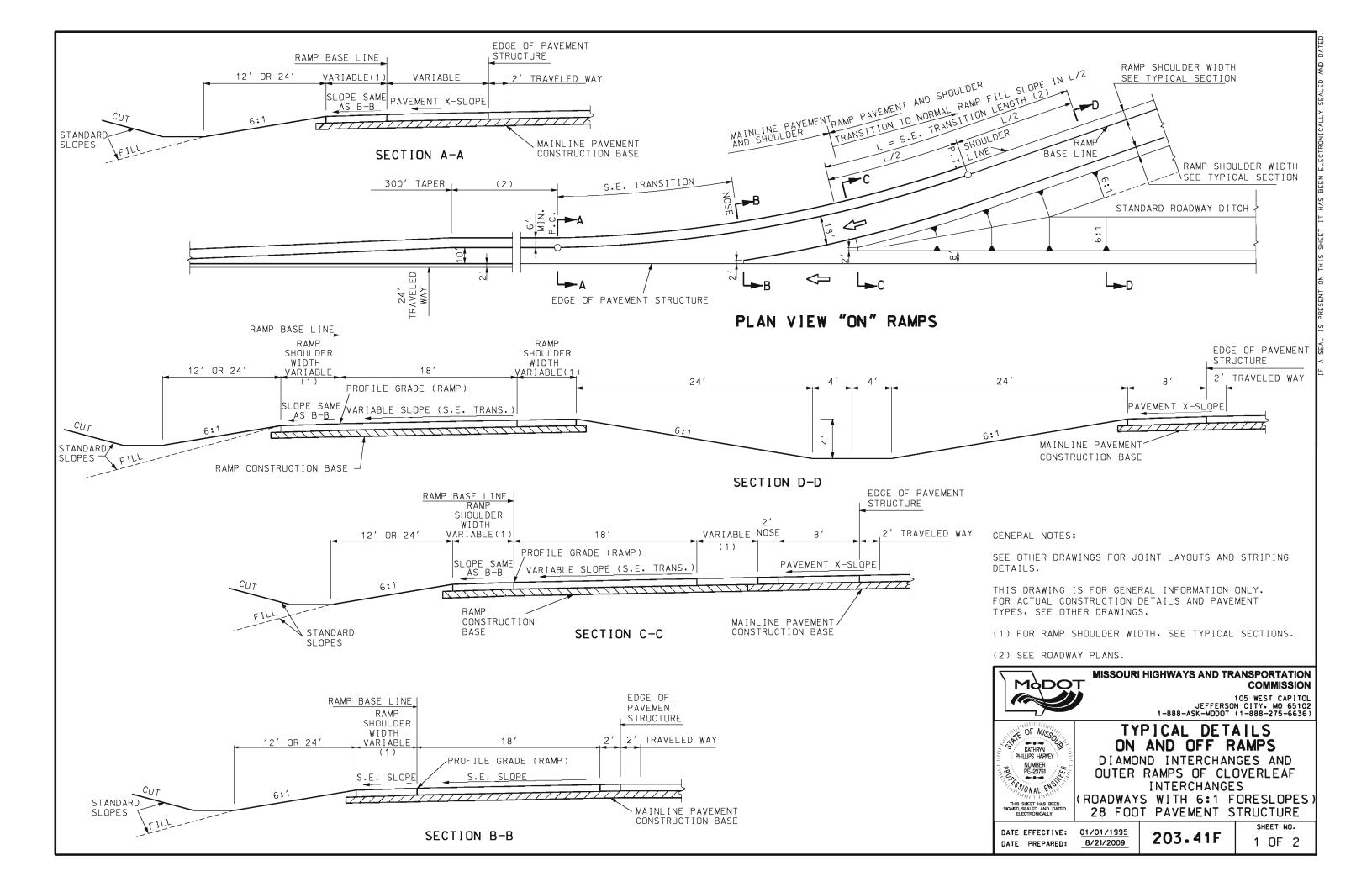
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DATE PREPARED: 8/21/2009

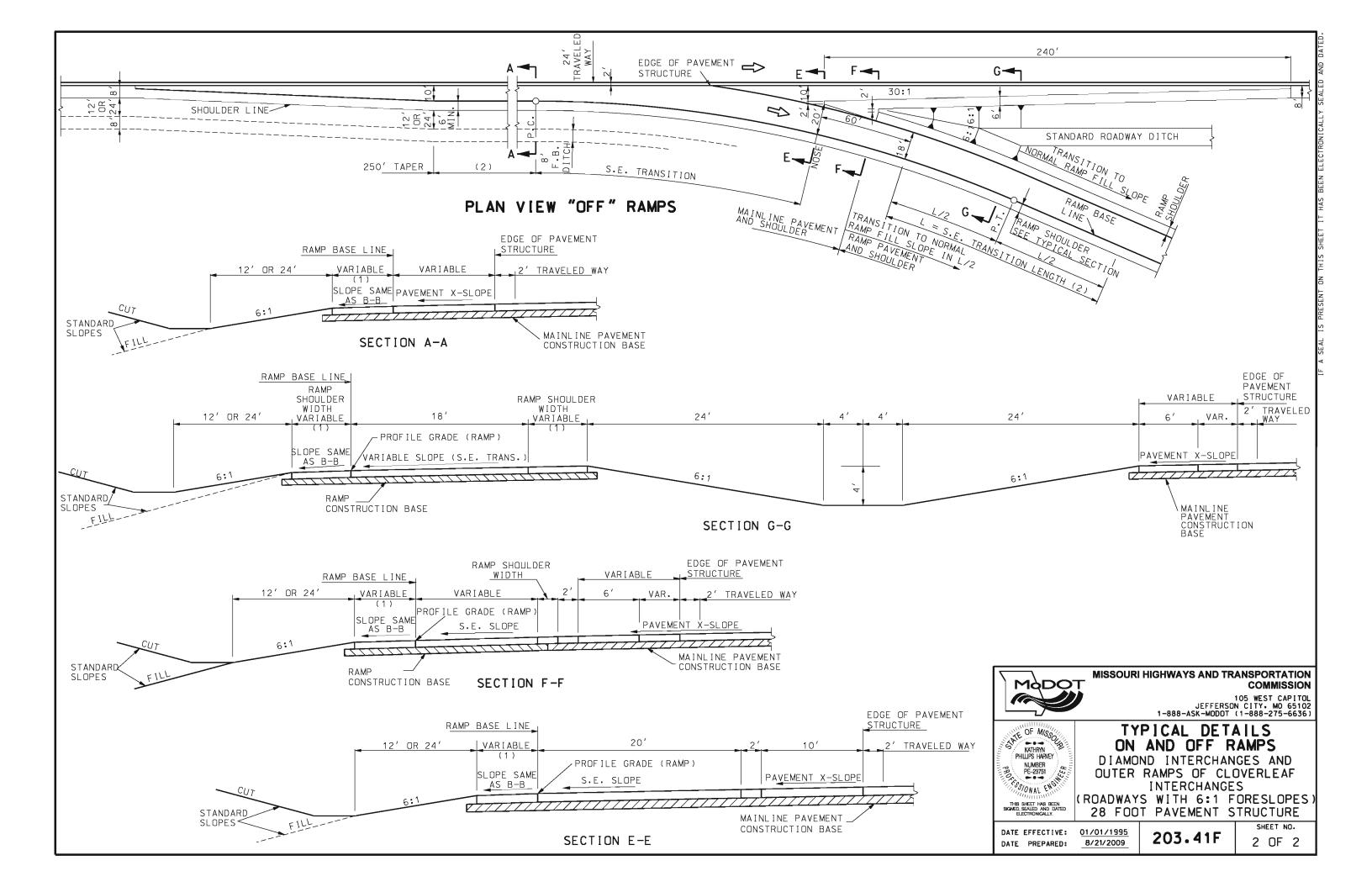
 $\frac{81}{9}$  203

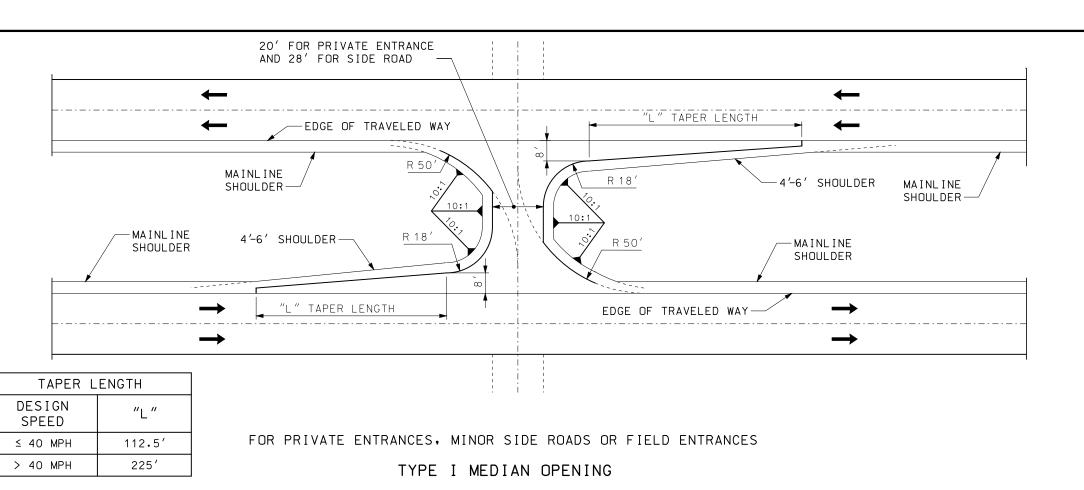
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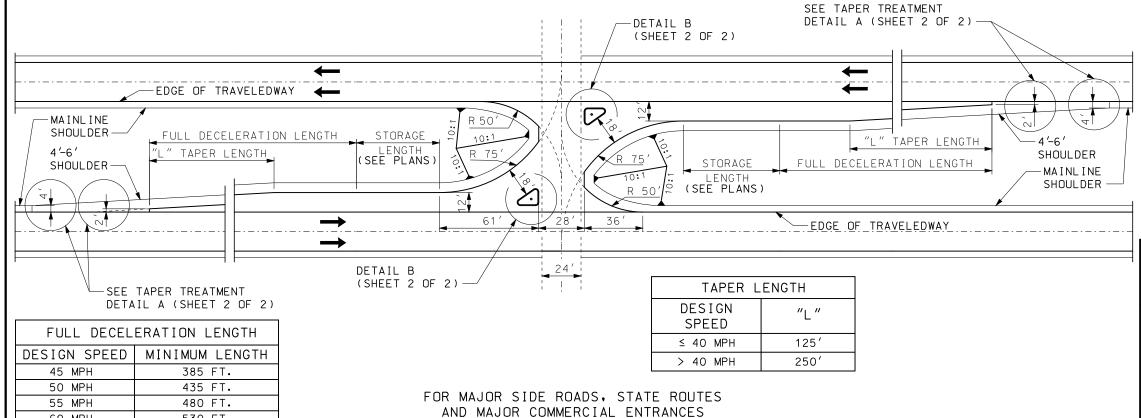


NOTES FOR TYPE I MEDIAN OPENINGS:

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.



TYPE II MEDIAN OPENING

60 MPH

65 MPH

70 MPH

530 FT.

570 FT.

615 FT.

NOTES FOR TYPE II MEDIAN OPENINGS:

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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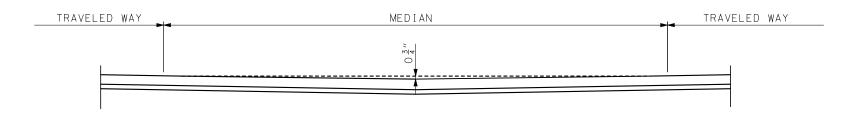
### TYPICAL MEDIAN OPENING

DIVIDED HIGHWAYS

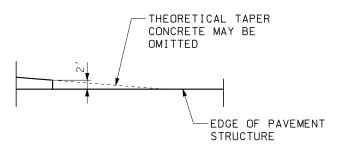
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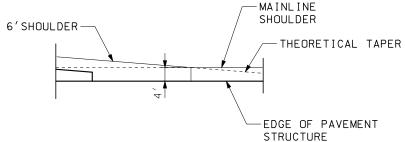
DATE EFFECTIVE: 04/01/2016 2/11/2016

203.50N



#### SECTION ALONG MEDIAN OPENING &

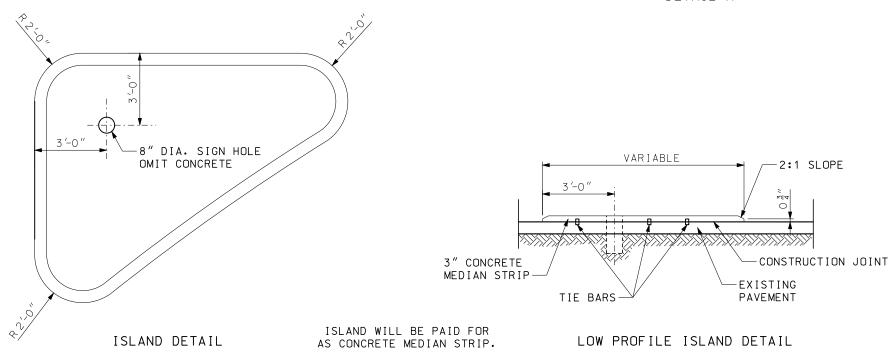




TAPER TREATMENT

SHOULDER TAPER TREATMENT

#### DETAIL A



GENERAL NOTES: FOR DETAILS ON CONCRETE MEDIAN STRIP CONSTRUCTION, SEE STANDARD PLAN 608.30.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



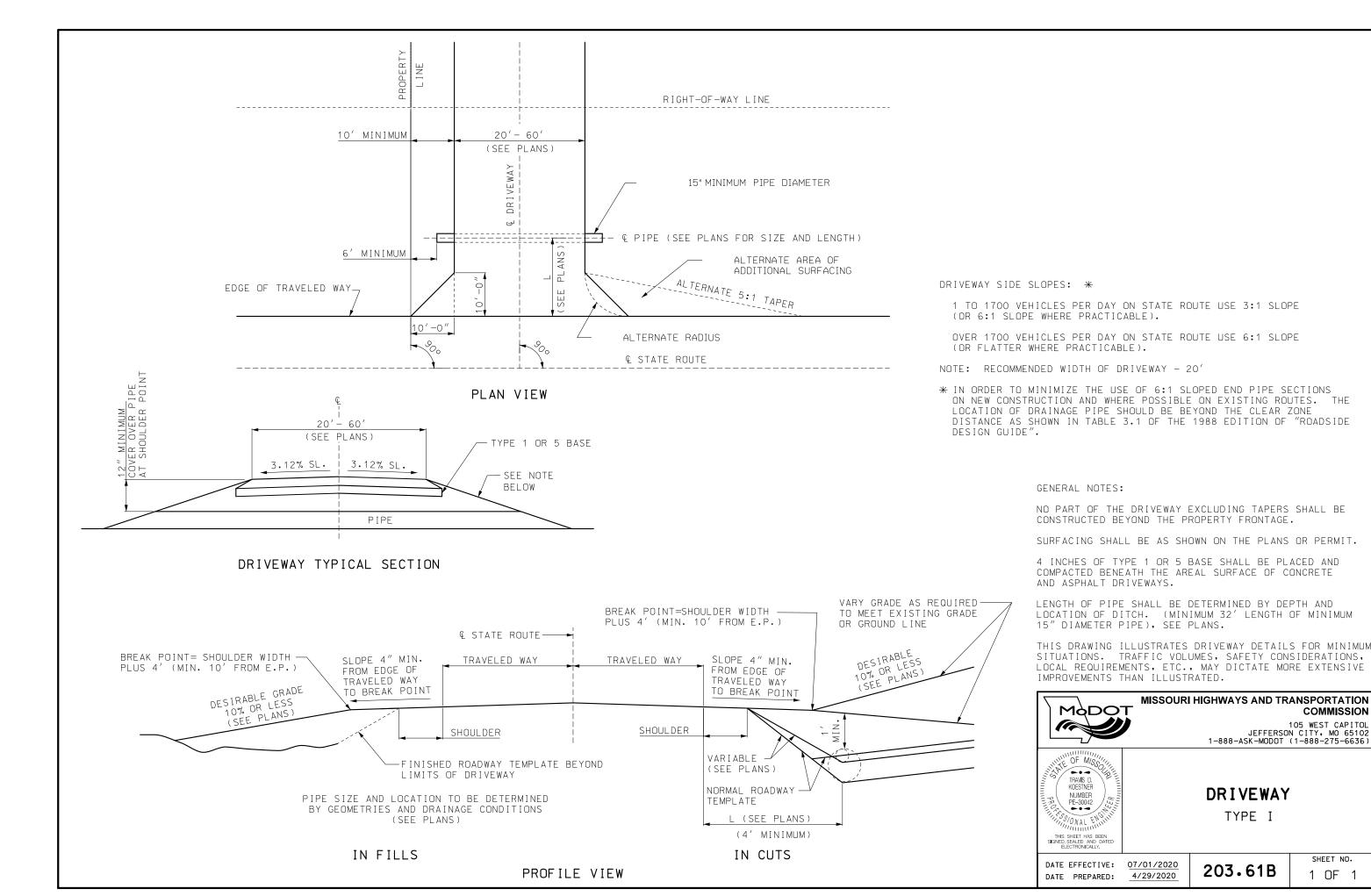
# TYPICAL MEDIAN OPENING

DIVIDED HIGHWAYS

DETAIL B

DATE EFFECTIVE: 04/01/2016 DATE PREPARED: 2/11/2016

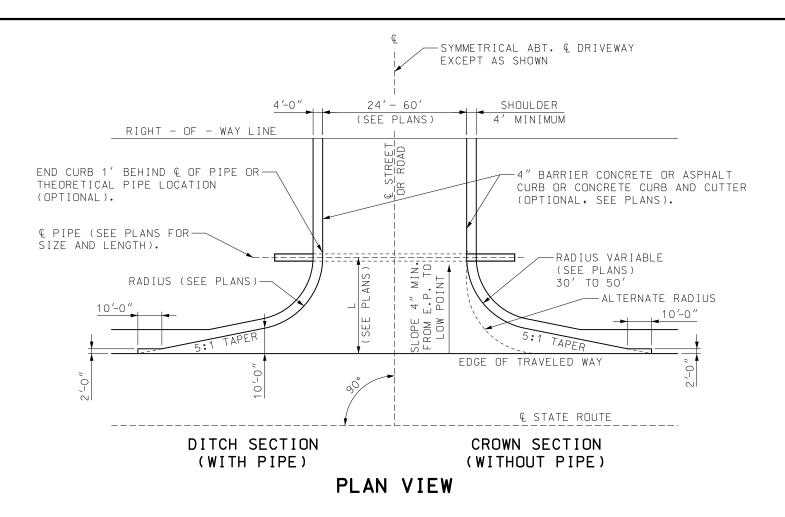
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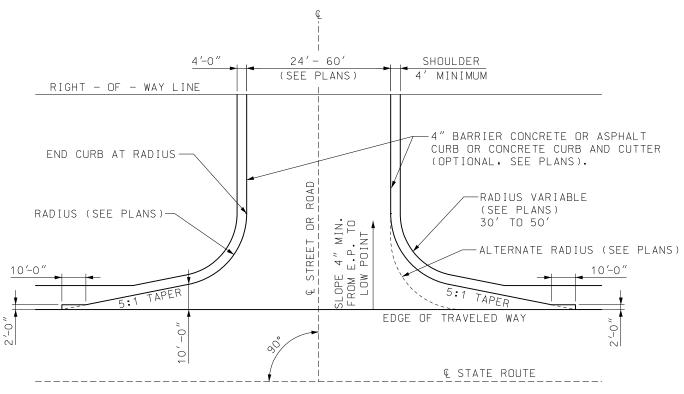


COMMISSION

SHEET NO.

1 OF 1





FILL SECTION OR CROWN SECTION (WITHOUT PIPE)

PLAN VIEW

GENERAL NOTES:

RECOMMENDED WIDTH OF ROADWAY - 24' WITHOUT PARKING ON ROAD AND 32' WITH PARKING ON ROAD.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OF 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF ASHPALT AND CONCRETE DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLANS 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

THIS DRAWING ILLUSTRATES DETAILS FOR MINIMUM SITUATIONS, TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

A MINIMUM 100-FOOT SIGHT DISTANCE TRIANGLE, MEASURED ALONG THE CENTERLINE OF THE INTERSECTING ROADWAYS, SHOULD BE PROVIDED.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

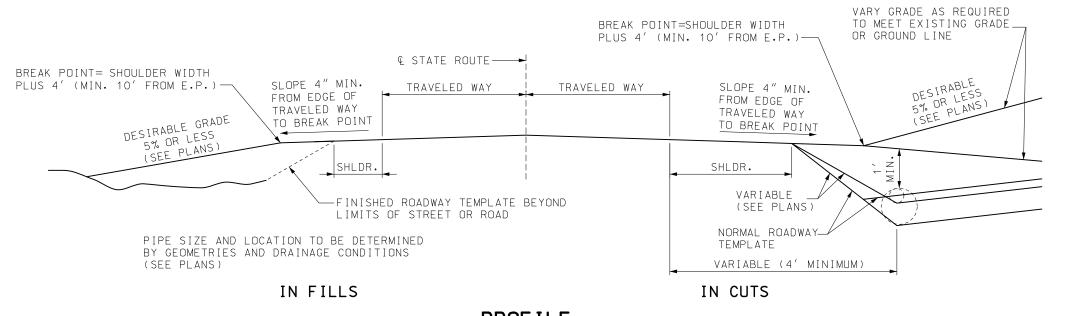
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



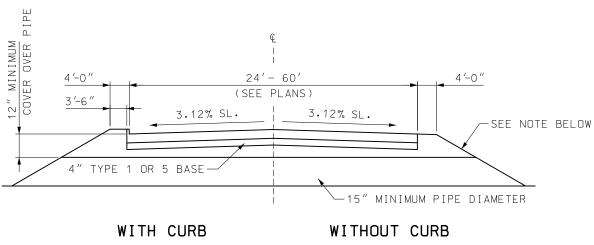
# DRIVEWAY TYPE II

DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020

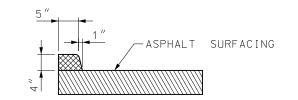
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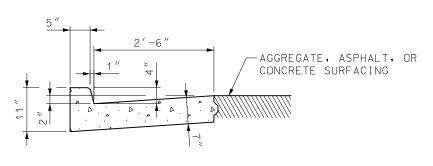
# **PROFILE**



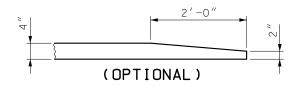
DRIVEWAY TYPICAL SECTION



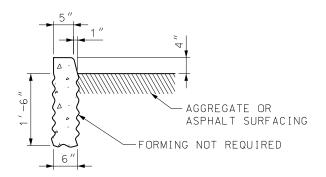
## SECTION THRU 4" ASPHALT CURB



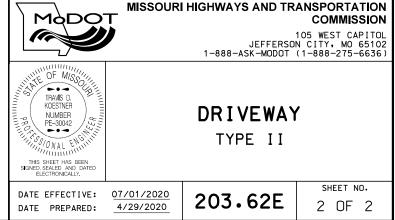
SECTION THRU CONCRETE CURB AND GUTTER



CURB TERMINUS DETAIL



SECTION THRU 4" BARRIER CURB

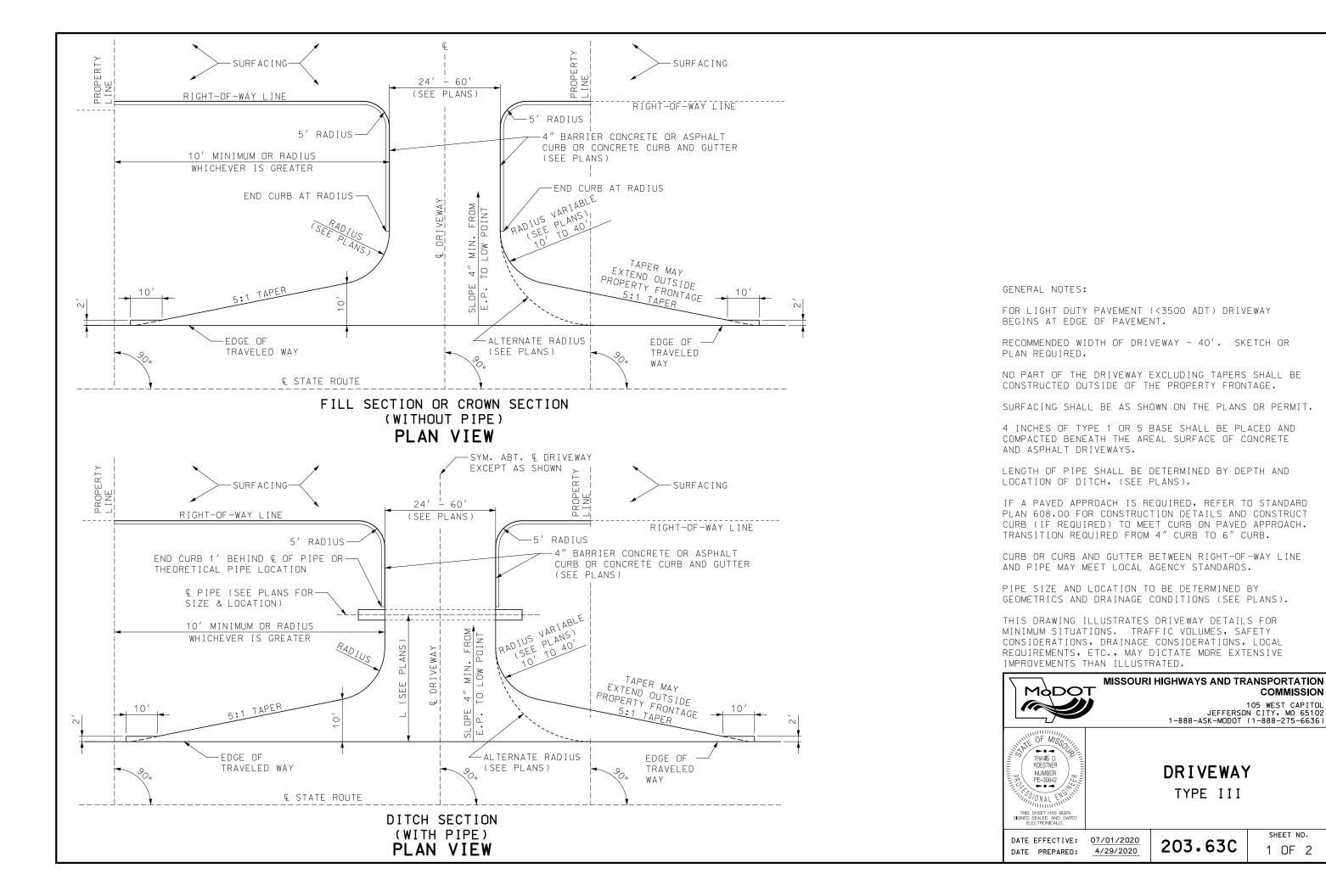


DRIVEWAY SIDE SLOPES: \*

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

\* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES. THE LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".

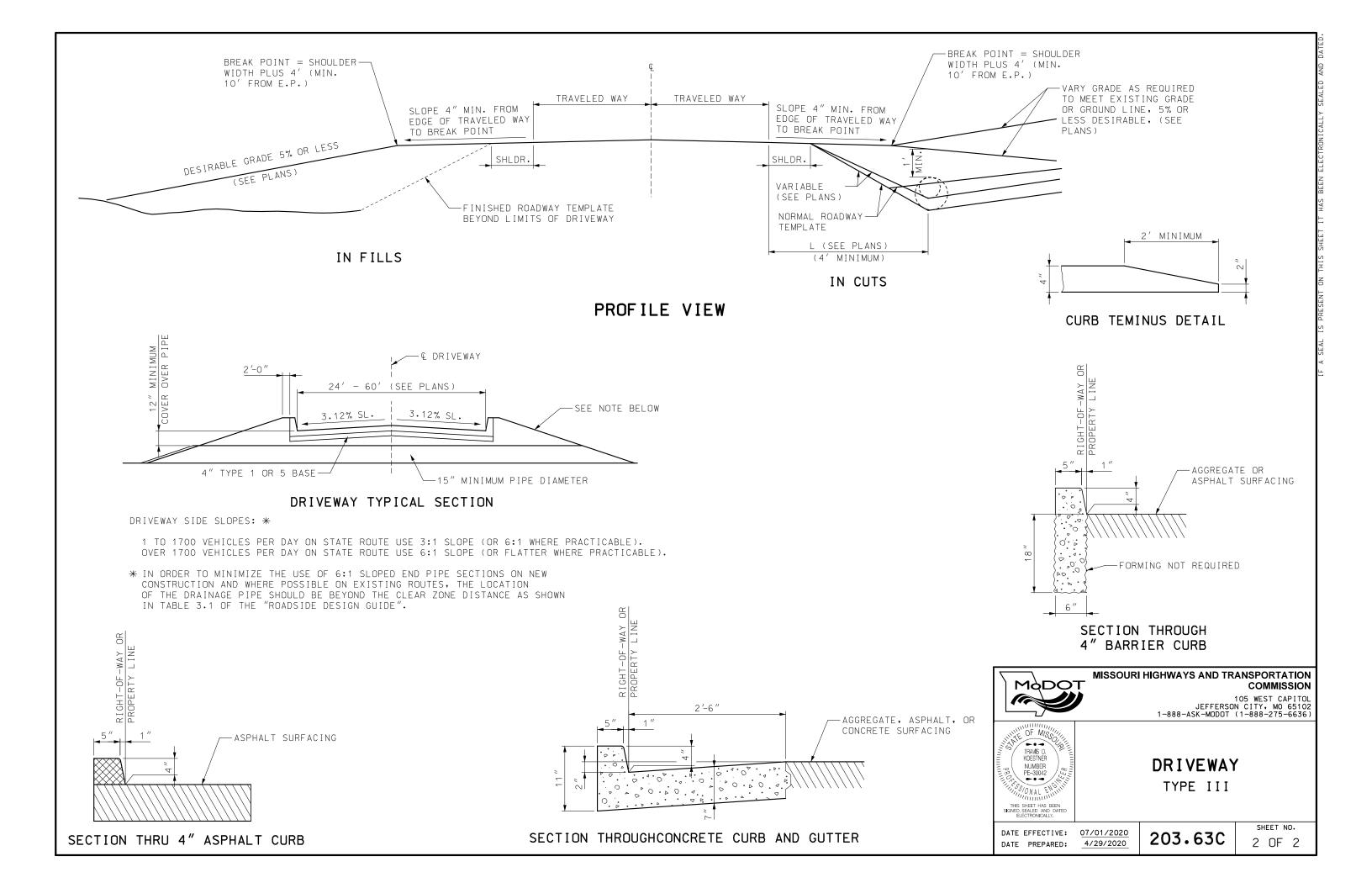


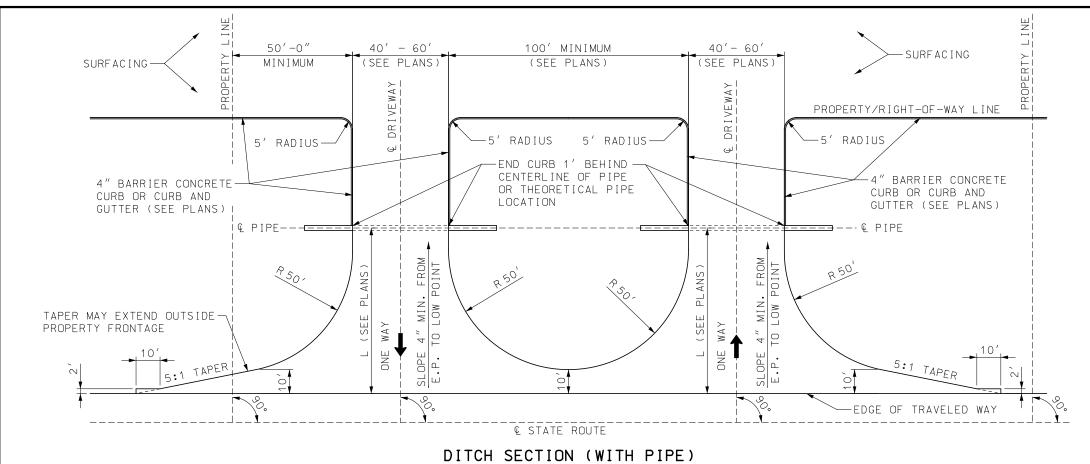
COMMISSION

105 WEST CAPITOL

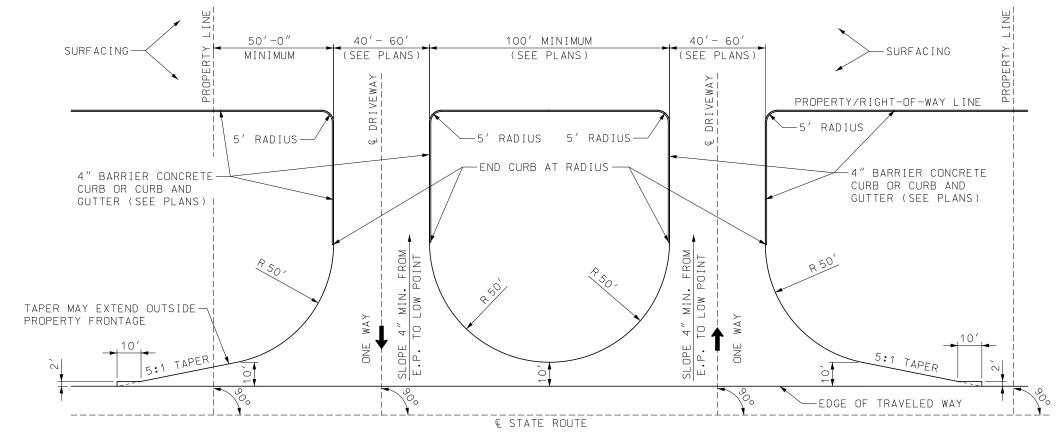
SHEET NO.

1 OF 2





# PLAN VIEW



FILL SECTION OR CROWN SECTION (WITHOUT PIPE)
PLAN VIEW

GENERAL NOTES:

RECOMMENDED WIDTH OF ROADWAY - 40'.

NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED OUTSIDE OF THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

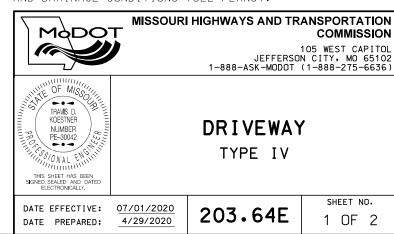
IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLAN 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

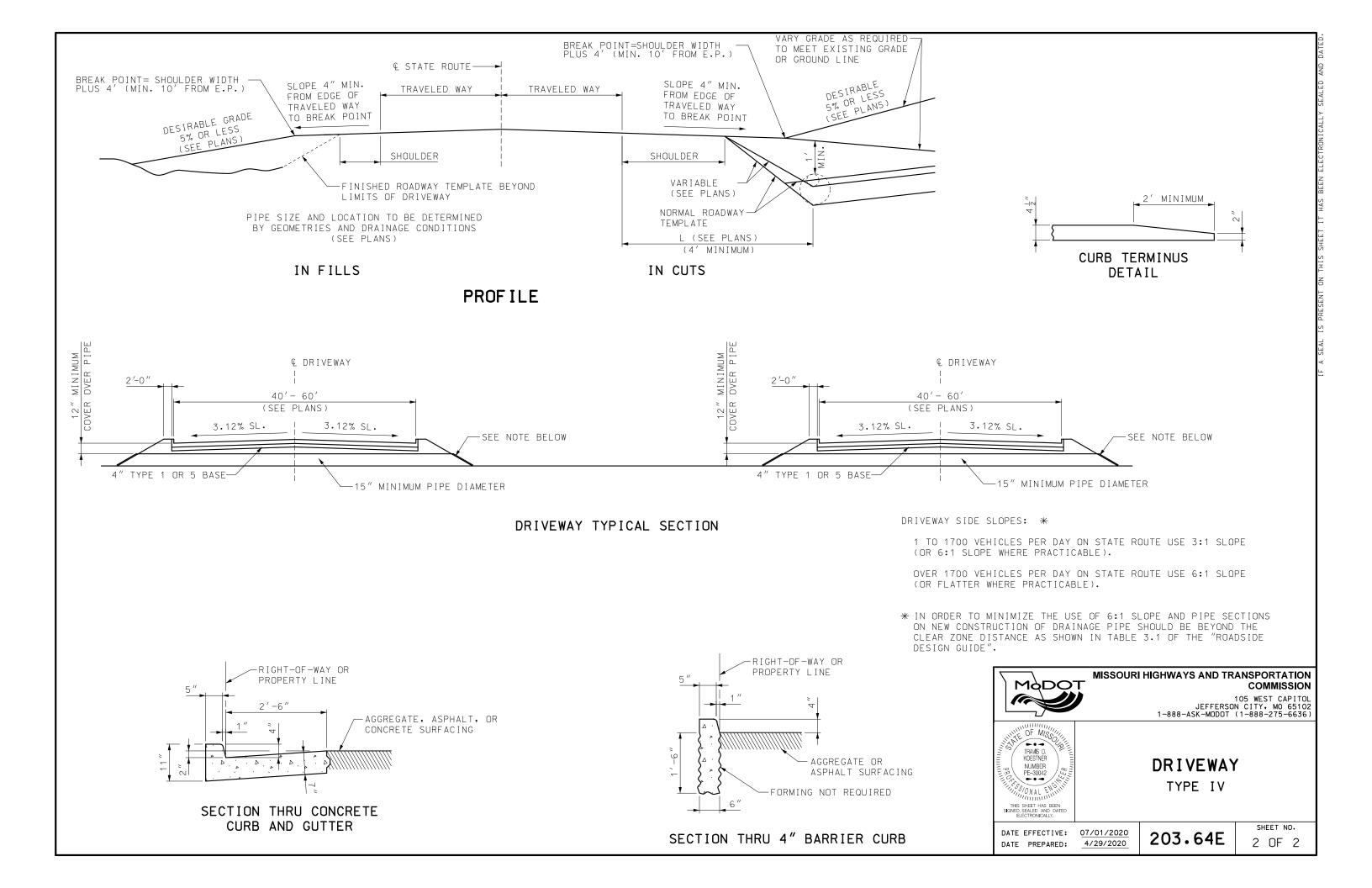
CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

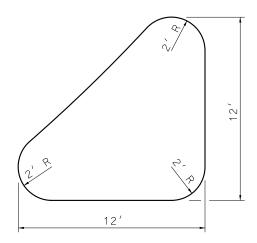
THE DRIVEWAY WIDTH SHALL BE DETERMINED AT THE TANGENT POINT OF THE RADIUS AND SIDE OF DRIVEWAY.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).





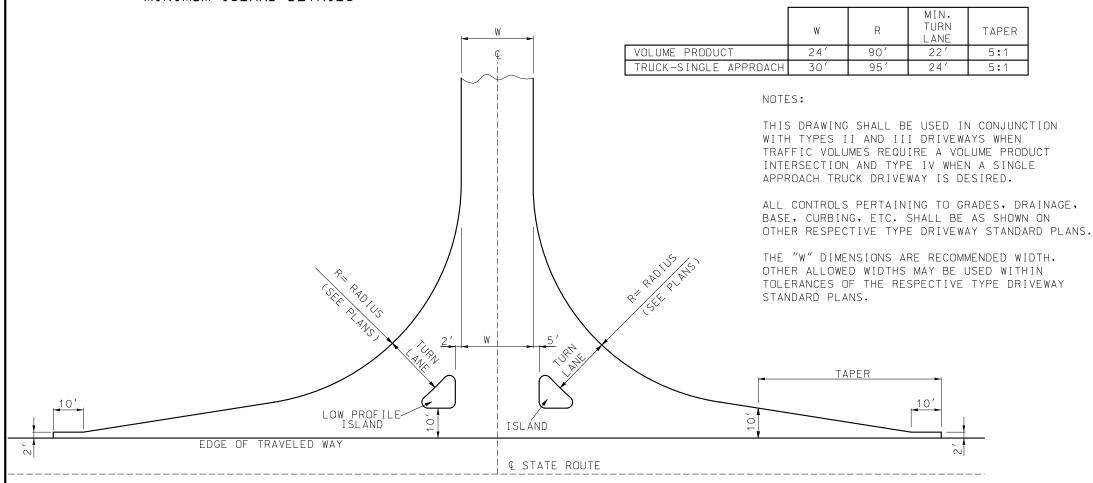


NOTE:

SEE STANDARD PLAN 203,50 FOR DETAILS OF LOW PROFILE ISLAND.

WHERE MINIMUM ISLAND CANNOT BE OBTAINED, OMIT ISLAND.

#### MINIMUM ISLAND DETAILS



PLAN VIEW

GENERAL NOTES:

DETAILS SHOWN ON THIS SHEET ARE FOR RIGHT ANGLE APPROACHES.

TAPER LENGTHS ARE NOT APPLICABLE WHEN DECELERATION LANES ARE PROVIDED.

SIGNALIZED INTERSECTIONS AND INTERSECTIONS IN DEVELOPED AREAS MAY BE MODIFIED TO MEET EXISTING CONDITIONS.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINI-MUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDER-ATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIRE-MENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



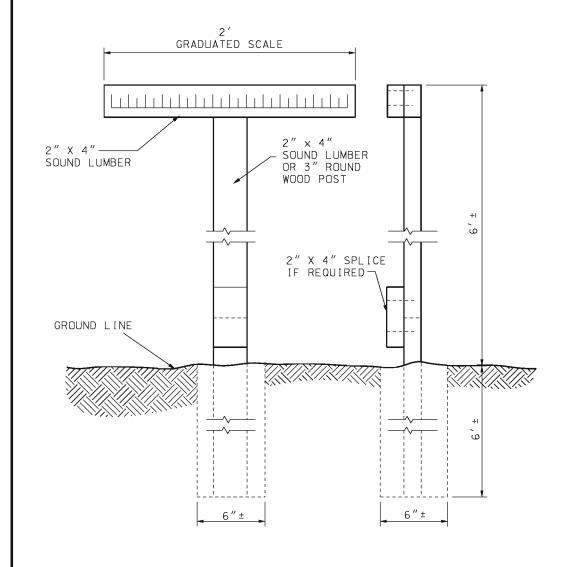
# DRIVEWAY

TYPE V

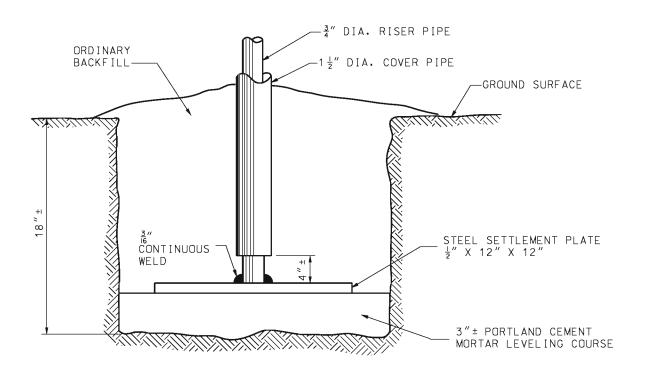
DATE PREPARED: 4/29/2020

DATE EFFECTIVE: 07/01/2020

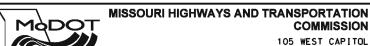
203.65B



EMBANKMENT CONTROL STAKE



SETTLEMENT GAUGE



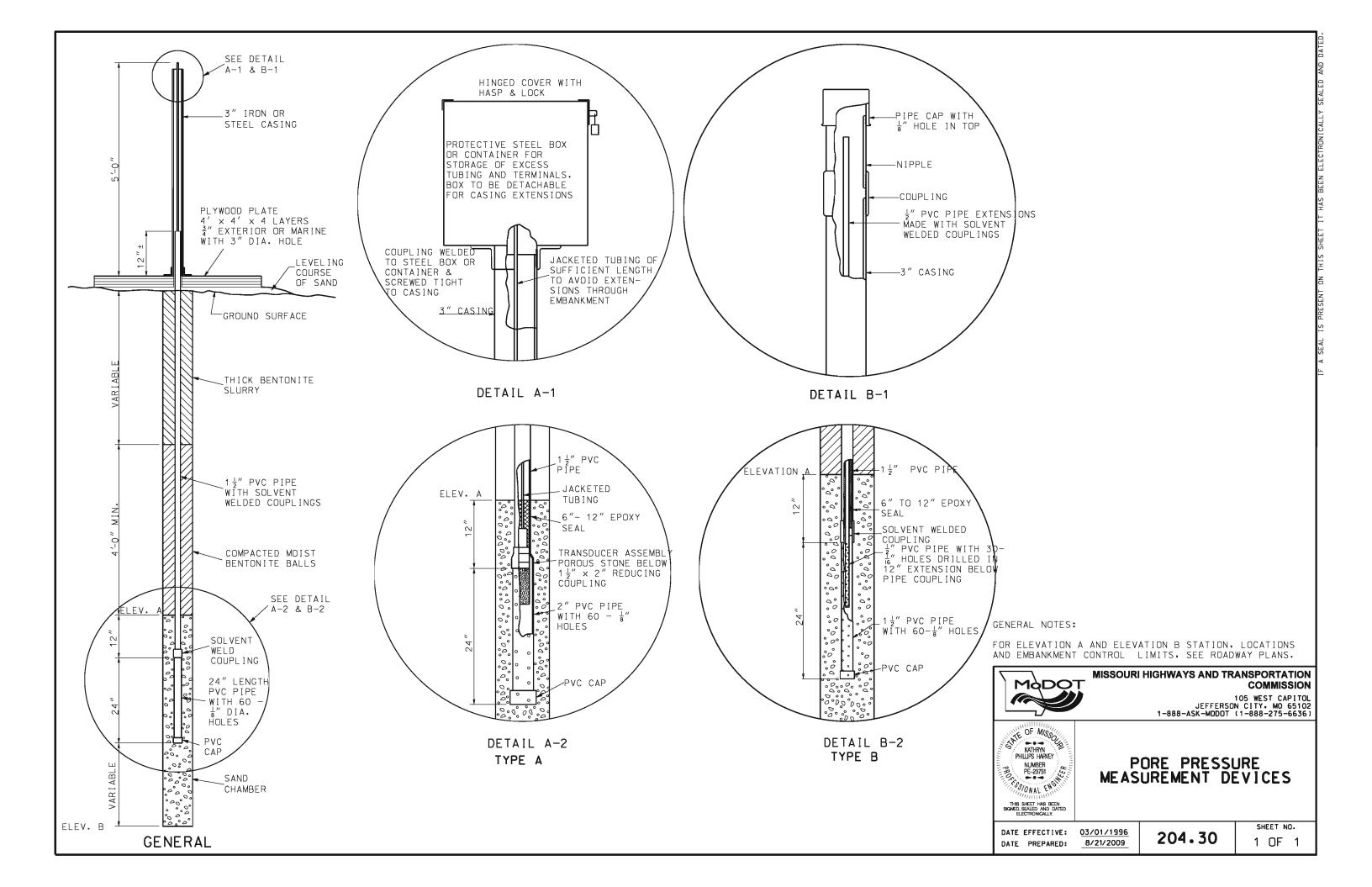
105 WEST CAPITOL JEFFERSON CITY: MO 65102 1-888-ASK-MODOT (1-888-275-6636)

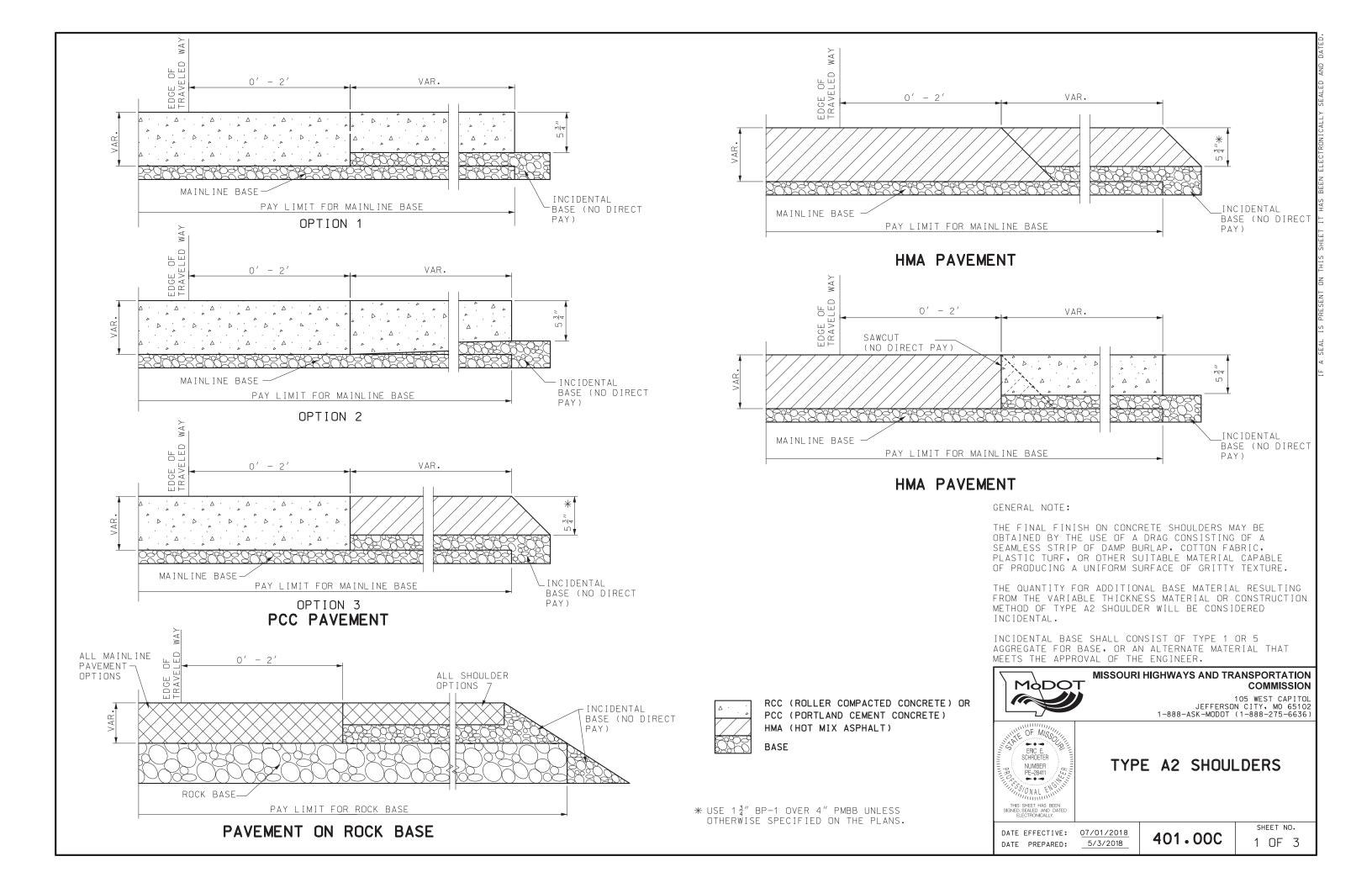


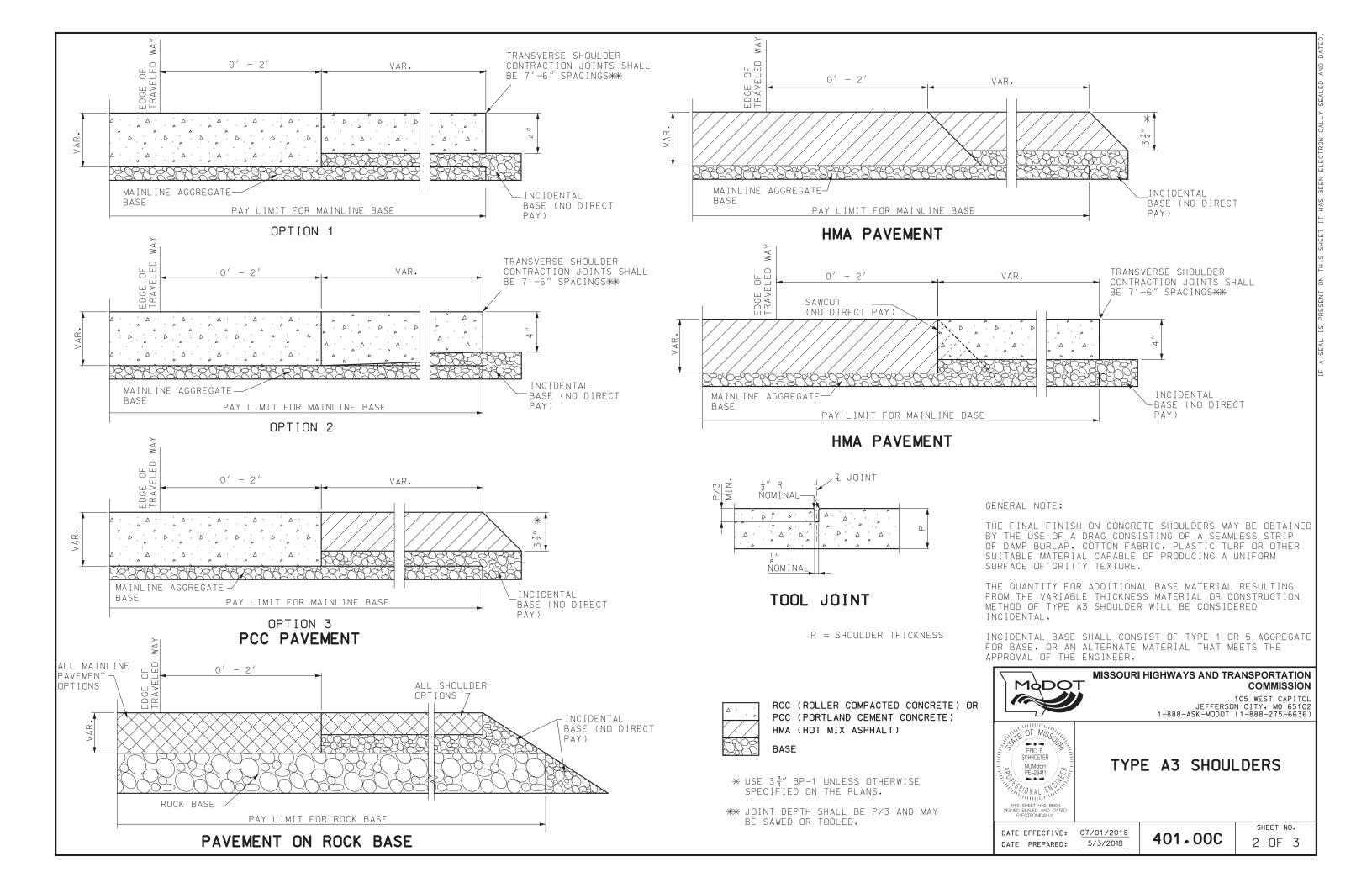
EMBANKMENT CONTROL MEASURING DEVICES

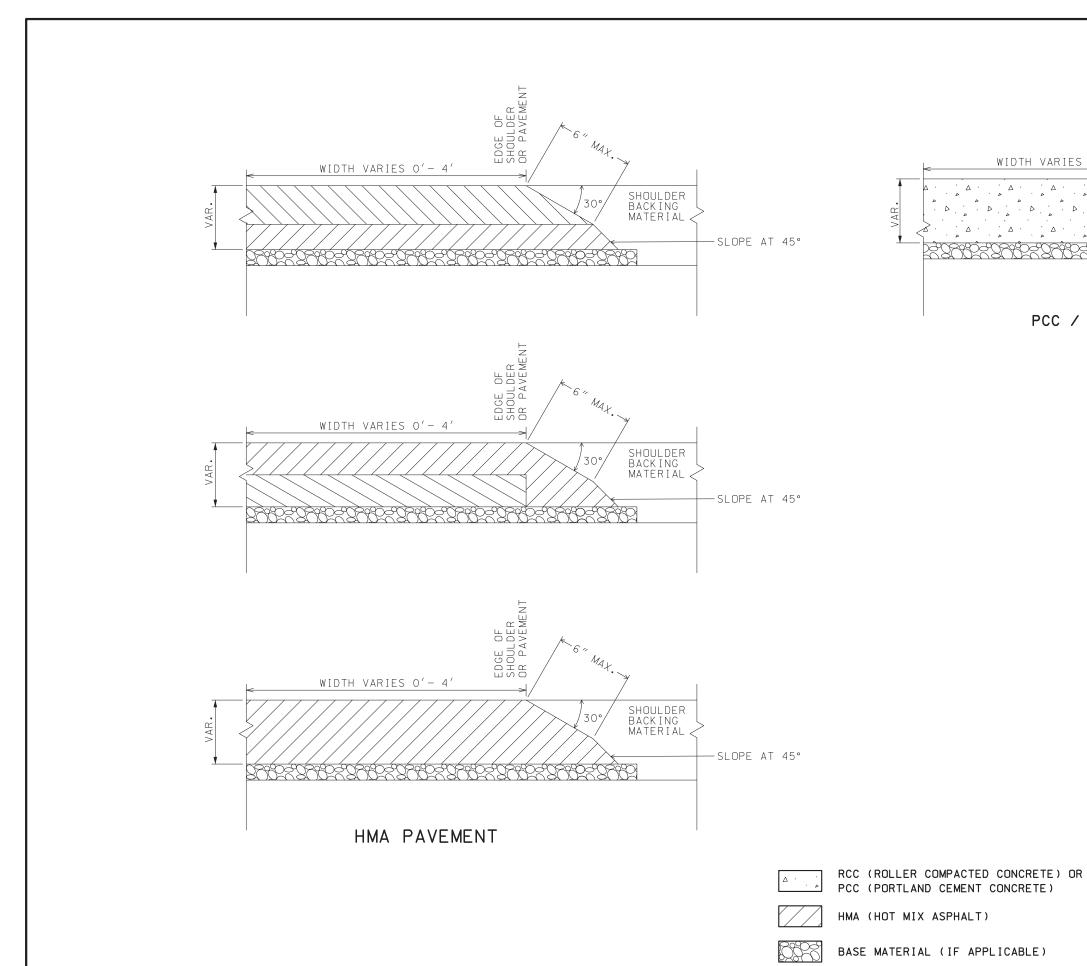
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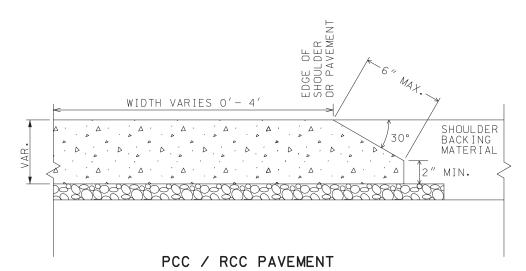
204.00D











GENERAL NOTES:

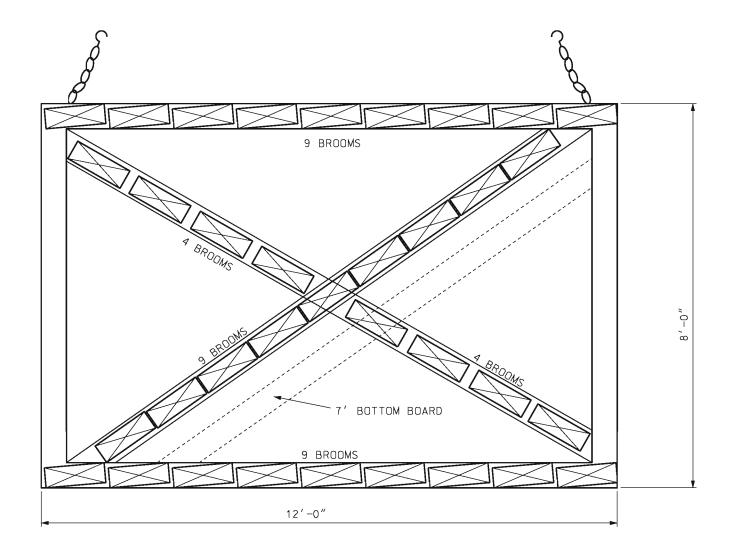
THE SAFETY EDGE<sup>SM</sup> SHALL BE CONSTRUCTED AT A SLOPE OF 30° FROM THE HORIZONTAL. THE LENGTH, AS MEASURED ALONG THE SLOPE, SHALL BE APPROXIMATELY 2 TIMES THE DEPTH, UP TO A MAXIMUM LENGTH OF 6".

THE SAFETY EDGE  $^{\text{SM}}$  SHALL BE CONSTRUCTED MONOLITHICALLY WITH THE SHOULDER OR PAVEMENT.

THE SAFETY EDGE<sup>SM</sup> SHALL BE BACKFILLED AS SHOWN.

REGARDLESS OF PAVEMENT TYPE, WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE PER SQUARE YARD, THE MATERIAL NECESSARY TO CONSTRUCT THE SAFETY EDGE<sup>SM</sup> IS CONSIDERED INCIDENTAL TO THE PAVEMENT OR SHOULDER. NO MEASUREMENT WILL BE MADE FOR THE MATERIAL USED IN THE SAFETY EDGE<sup>SM</sup> EXCEPT WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE IN VOLUME OR WEIGHT.





STREET BROOMS WITH NYLON BRISTLES

COORD  $\frac{3}{8}$ " CHAIN WITH HOOKS



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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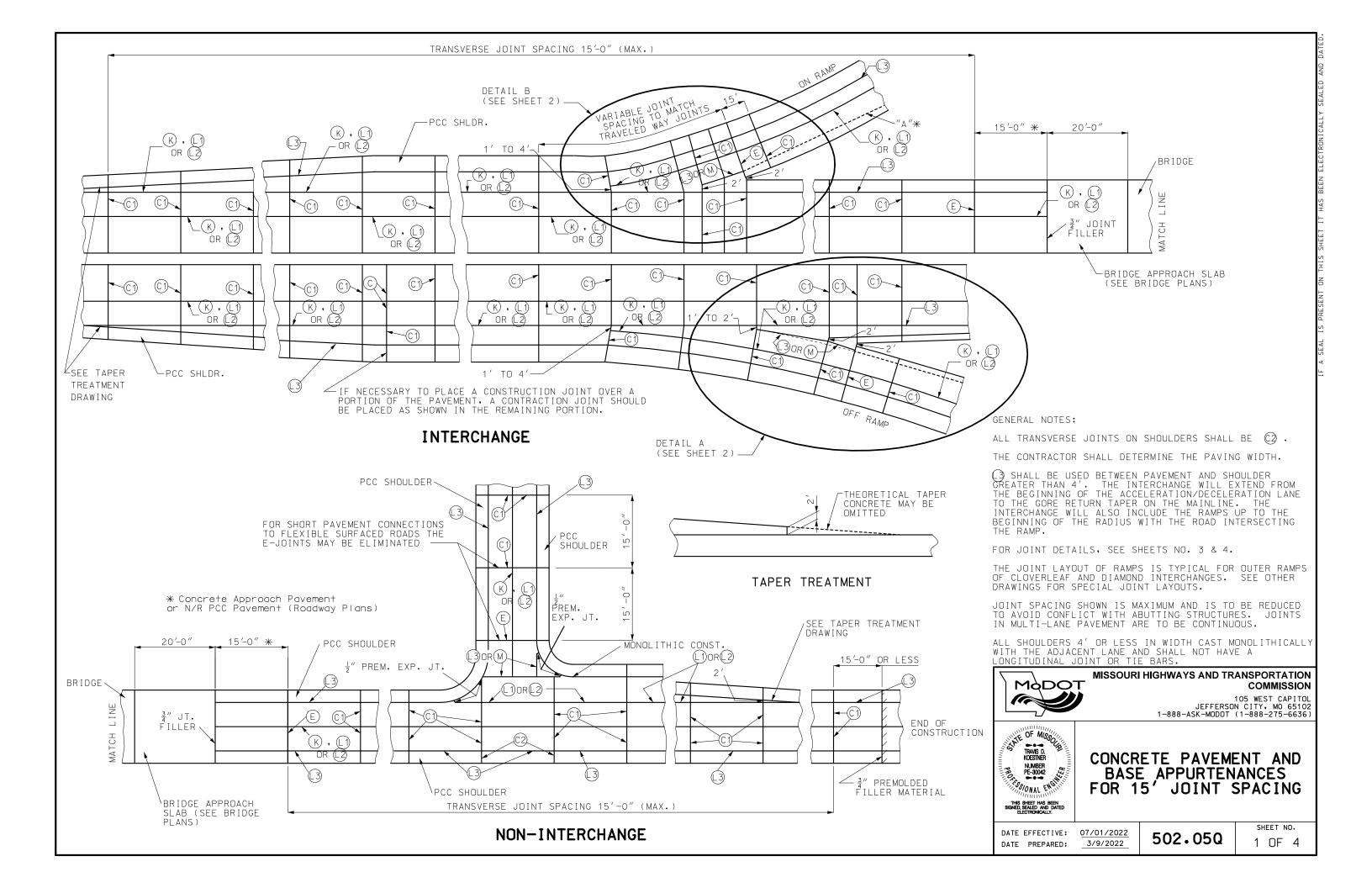


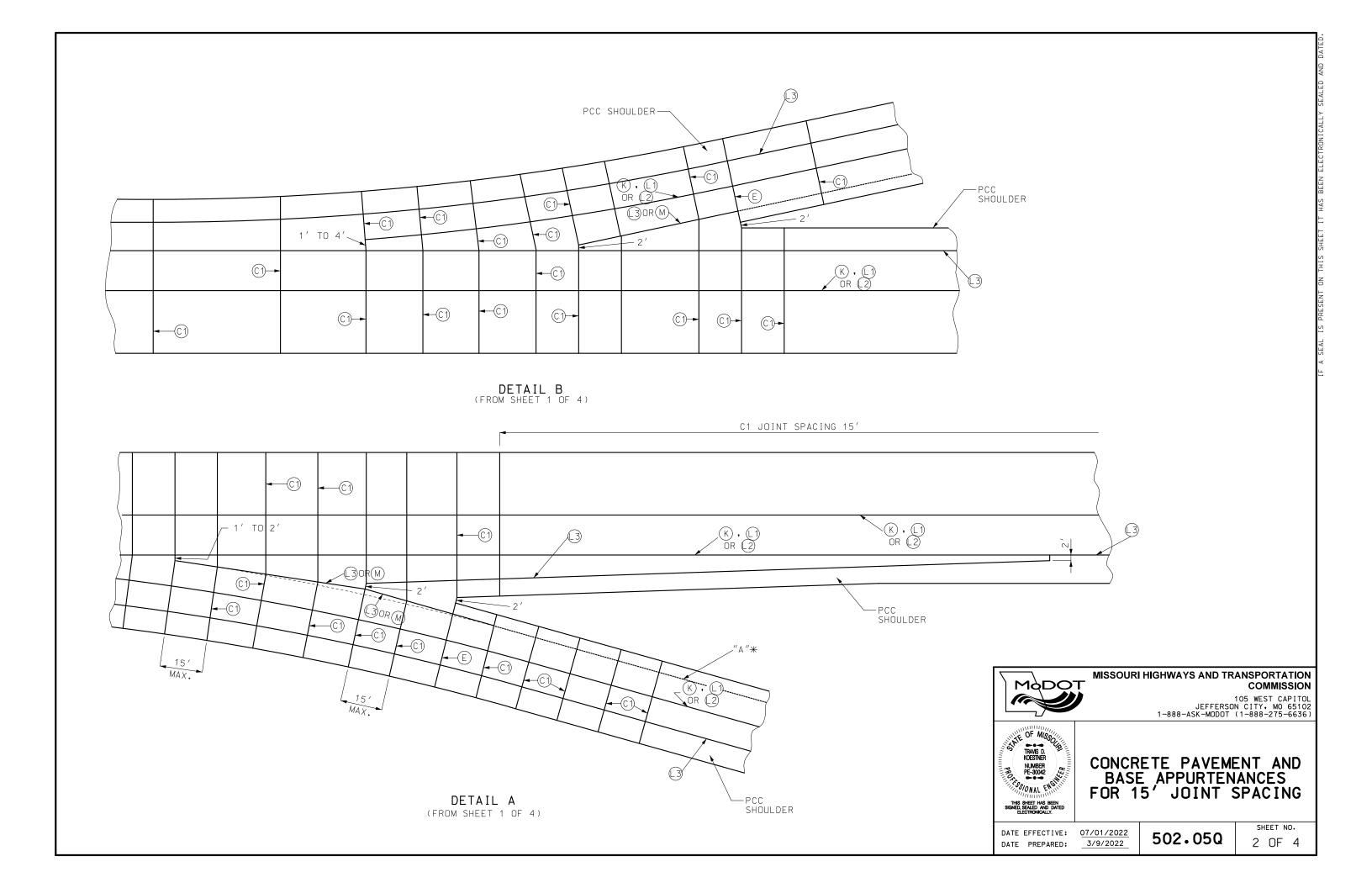
# SCRUB SEAL BROOM CONFIGURATION

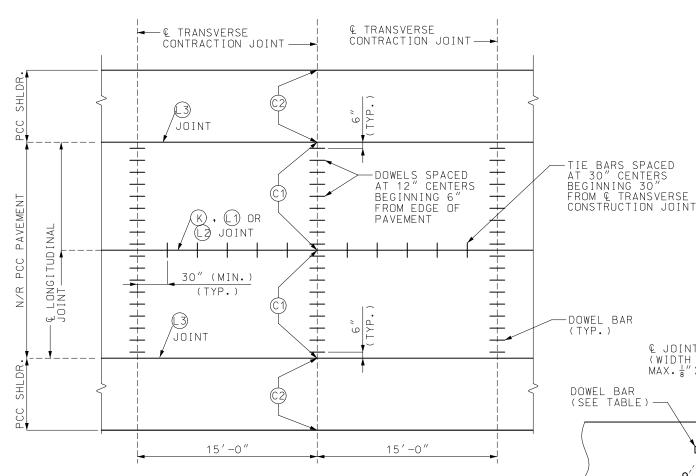
THIS SHEET HAS BEEN SIGNED, SEALED AND DAT ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/21/2009

413.20

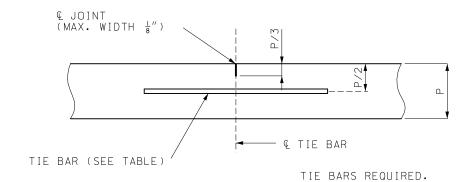






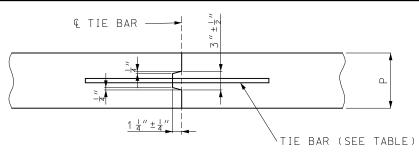
## JOINT PLAN AND SPACING FOR CONTRACTION JOINTS

(1) LONGITUDINAL JOINT NOT REQUIRED FOR 4' OR LESS INSIDE SHOULDER, PAVED MONOLITHICALLY WITH ADJACENT DRIVING LANE, ON DIVIDED HIGHWAYS AND RAMPS.



# LONGITUDINAL JOINT (1)

7	TIE BAR AND DOWEL TABLE											
PCCP THICKNESS (P)	DOWEL SIZE	TIE BAR SIZE	DOWEL SPACING	TIE BAR SPACING								
LESS THAN 7"	NONE	#5X30"	NONE	30" CTRCTR.								
7" TO 10"	1 ¼"X18"	#5X30"	12" CTRCTR.	30" CTRCTR.								
GREATER THAN 10"	1 ½"X18"	#6X40"	12" CTRCTR.	30" CTRCTR.								



IF METAL IS USED TO FORM KEY DISCONTINUE STRIP FOR DISTANCE OF APPROXIMATELY 3" EACH SIDE OF TRANSVERSE JOINT.

TYPE (K) REQUIRES TIE BAR.

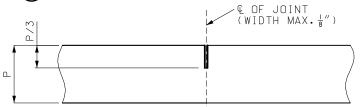
TYPE (M) CONSTRUCTED WITHOUT TIE BARS.

(K) AND (M) JOINTS SHALL NOT BE SAWED.

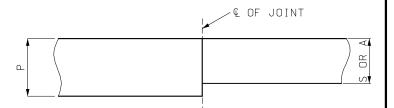
# TONGUE AND GROOVE JOINTS (K) AND (M)







# TRANSVERSE CONTRACTION JOINT(2)



## LONGITUDINAL CONSTRUCTION JOINT FOR SHOULDER AND APPROACHES

S = SHOULDER THICKNESSA = APPROACH THICKNESS



GENERAL NOTES:

THE FINAL POSITION OF ALL DOWELS AND TIE BARS SHALL BE PERPENDICULAR TO THE PLANE OF THE JOINT AND PARALLEL TO THE SURFACE OF THE PAVEMENT AND PARALLEL TO EACH OTHER.

(3) JOINT FOR FULL DEPTH OR PARTIAL DEPTH SHOULDERS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



MODOT

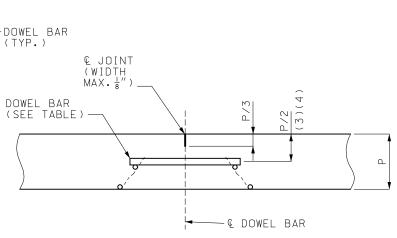
CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING

DATE EFFECTIVE: 07/01/2022 DATE PREPARED:

3/9/2022

502.05Q

SHEET NO. 3 OF 4



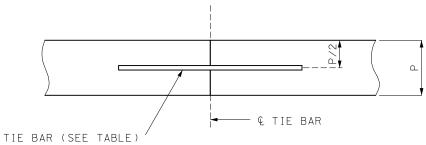
DOWELS REQUIRED. FOR PERMISSIBLE TYPES OF DOWELS SUPPORTING UNITS, SEE OTHER DRAWINGS.

TRANSVERSE CONTRACTION JOINTS FOR CONCRETE PAVEMENT OR BASE WIDENING SHALL MATCH EXISTING JOINTS.

# TRANSVERSE CONTRACTION JOINT (C1)

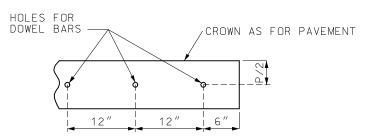
- (2) DOWEL BARS ARE REQUIRED FOR ALL PAVEMENTS HAVING THE SAME THICKNESS AS THE TRAVELED WAY.
- (3) FOR PAVEMENTS HAVING THICKNESS IN 1/2" INCREMENTS, DOWEL BASKETS SHALL BE P/2- 1/2".

  (4) DOWEL BARS MAY BE PLACED BY MECHANICAL MEANS AT THE
- OPTION OF THE CONTRACTOR.

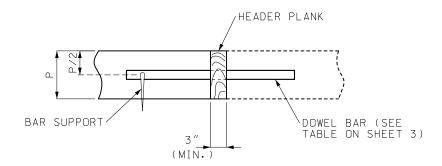


TIE BARS REQUIRED.

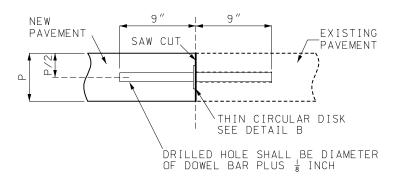
# LONGITUDINAL CONSTRUCTION JOINT



PART ELEVATION OF HEADER PLANK



#### HEADER SECTION



#### SAWED SECTION

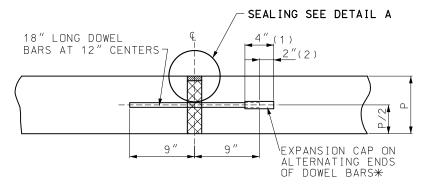
THE HEADER BOARD SHALL BE SUFFICIENTLY RIGID TO PREVENT DISTORTION FROM THE TYPICAL SECTION AND MAINTAIN A STRAIGHT LINE FROM PAVEMENT EDGE TO PAVEMENT EDGE.

THE CONSTRUCTION JOINT MAY BE SAWED FULL DEPTH. HOLES FOR DOWEL BARS SHALL BE DRILLED AFTER THE CONCRETE HAS SUFFICIENT SET TO PREVENT DAMAGE. DOWEL BARS SHALL BE BONDED INTO THE HOLES.

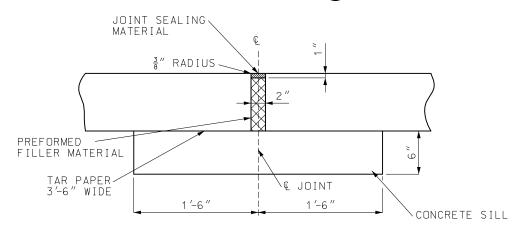
BONDING FOR DOWEL BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION

THE PORTION OF THE DOWEL OUTSIDE THE HOLE SHALL BE COATED WITH AN APPROVED LUBRICANT.

CONSTRUCTION JOINT (C)

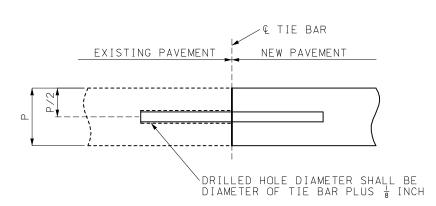


# EXPANSION JOINTS (E)



SILL SHALL EXTEND 18" BEYOND EACH EDGE OF THE PAVEMENT AND SHALL BE CONSTRUCTED OF CONCRETE REGARDLESS OF ADJACENT BASE MATERIAL.

ALTERNATE EXPANSION JOINTS (E) (CONTRACTOR MAY SELECT EITHER EXPANSION JOINT (E)



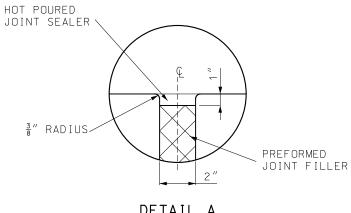
TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTIONS 710 AND 1057.

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

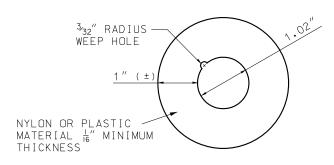
TIE BAR SIZE AND LENGTH SHALL BE BASED ON THE THICKNESS OF THE THINNER PAVEMENT OR SHOULDER TO BE TIED TOGETHER.

# LONGITUDINAL CONSTRUCTION JOINT (EXISTING PAVEMENT)

- (1) LENGTH OF CAP
- (2) GAP BETWEEN END OF CAP AND DOWEL.
- \* FOR EXPANSION JOINTS FORMED USING A CONSTRUCTION HEADER, THE EXPANSION CAPS SHALL BE INSTALLED ON THE EXPOSED END OF EACH BAR ONCE THE HEADER HAS BEEN REMOVED AND THE JOINT FILLER MATERIAL HAS BEEN INSTALLED.



DETAIL A **SEALING** 



DETAIL B THIN CIRCULAR DISK



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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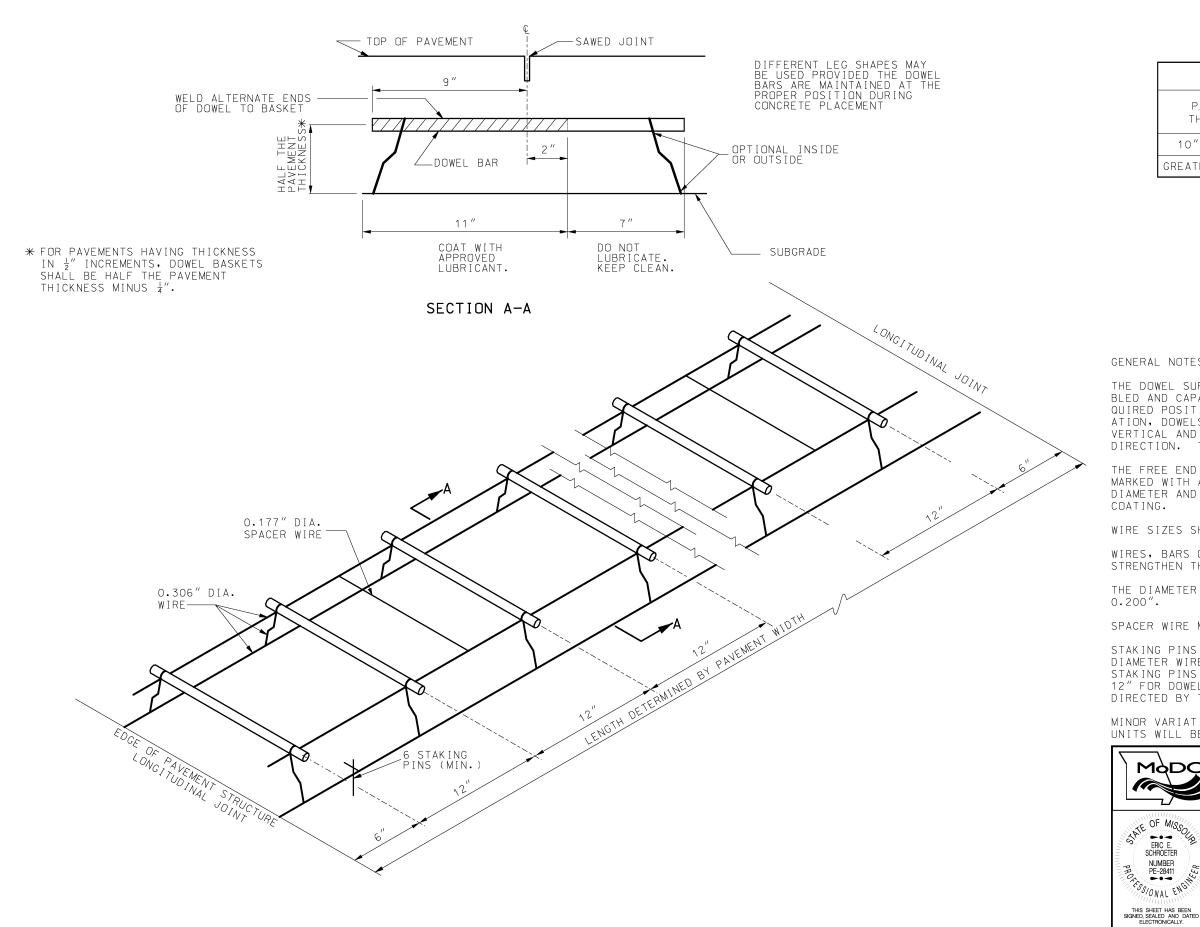


CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING

DATE EFFECTIVE: 07/01/2022 DATE PREPARED:

3/9/2022

502.05Q



DOWEL BARS										
PAVEMENT	BAR SIZE									
THICKNESS	DIAMETER	LENGTH								
10" AND LESS	1 ¼"	18"								
GREATER THAN 10"	1 ½"	18"								

#### GENERAL NOTES:

THE DOWEL SUPPORTING UNITS SHALL BE FACTORY ASSEM-BLED AND CAPABLE OF HOLDING THE DOWELS IN THEIR RE-QUIRED POSITIONS. IN THE COMPLETED JOINT INSTALL-ATION, DOWELS SHALL BE POSITIONED WITHIN 1/2" OF THE VERTICAL AND HORIZONTAL PLANE AND IN THE LONGITUDINAL DIRECTION. THE SKEW TOLERANCE SHALL BE 1/4".

THE FREE END OF EACH EPOXY COATED DOWEL SHALL BE MARKED WITH A SPOT OF PAINT AT LEAST ONE INCH IN DIAMETER AND CONTRASTING IN COLOR WITH THE EPOXY

WIRE SIZES SHOWN ARE MINIMUM REQUIRED.

WIRES, BARS OR CLIPS SHALL BE USED AS NECESSARY TO STRENGTHEN THE ASSEMBLIES.

THE DIAMETER OF THE SPACER WIRE SHALL NOT EXCEED

SPACER WIRE MAY BE CUT OR LEFT INTACT.

STAKING PINS SHALL BE FABRICATED FROM 0.306" DIAMETER WIRE MINIMUM WITH A SUITABLE HOOK. STAKING PINS SHALL HAVE A MINIMUM LENGTH OF 12" FOR DOWEL ASSEMBLIES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

MINOR VARIATIONS IN THE CONFIGURATION OF THE SUPPORT UNITS WILL BE ALLOWED.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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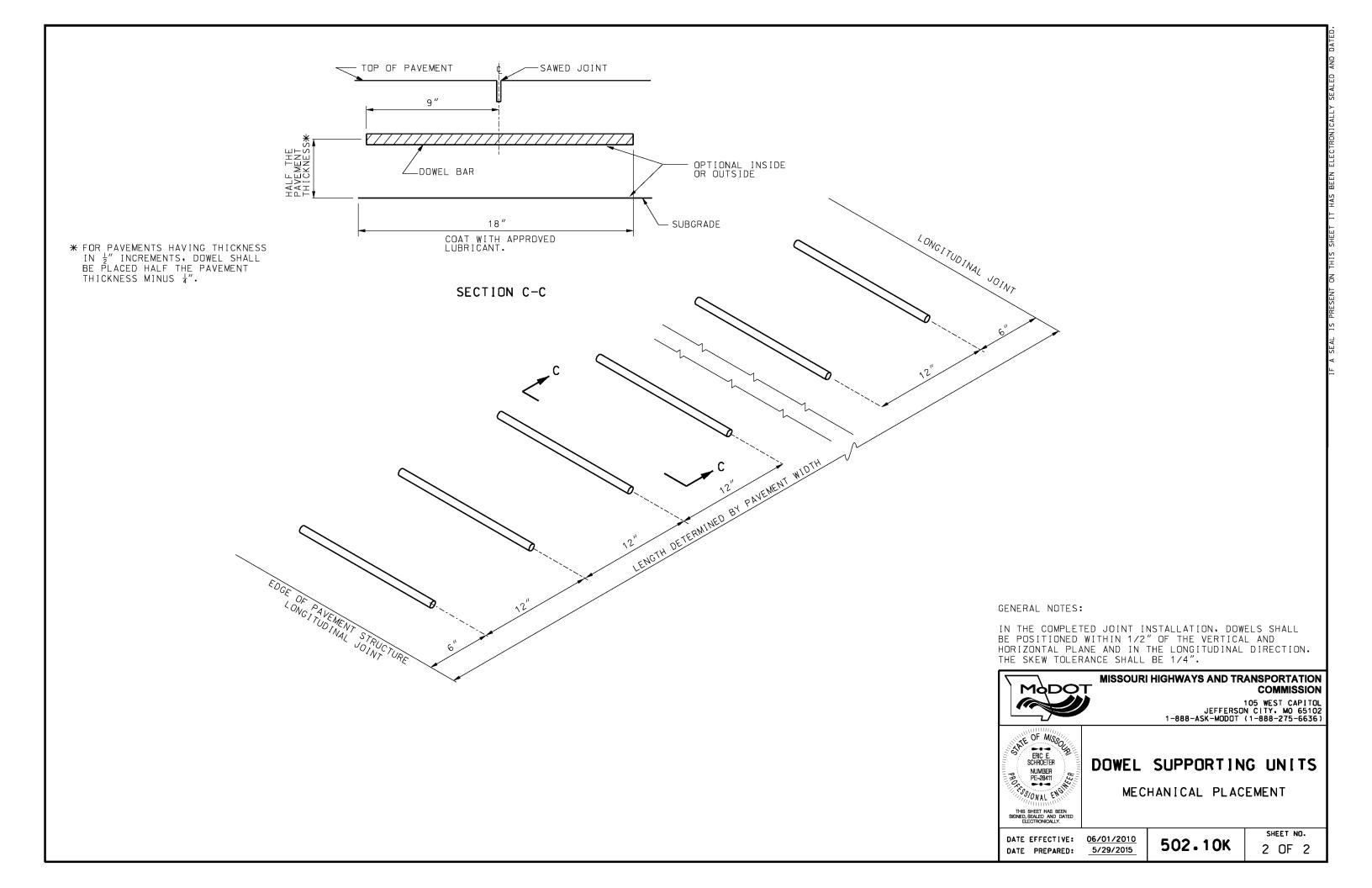
### DOWEL SUPPORTING UNITS

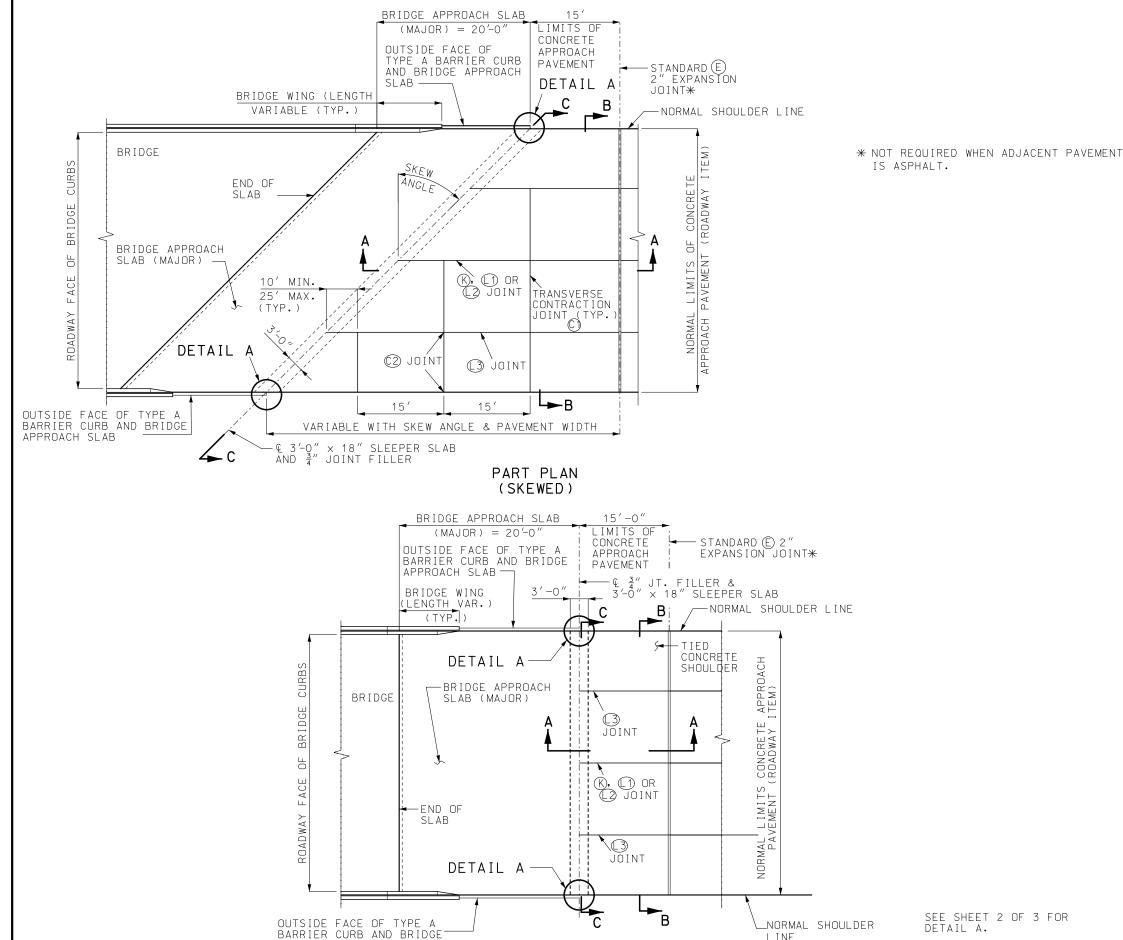
APPROVED FOR USE WITH TRANSVERSE JOINTS

DATE EFFECTIVE: DATE PREPARED:

06/01/2010 10/30/2015

502.10K





PART PLAN

(SQUARE)

APPROACH SLAB

DETAIL A.

FOR SECTIONS A-A, B-B AND

C-C, SEE SHEET 3 OF 3.

LINE

#### GENERAL NOTES:

TYPE A CURB IS TO BE CONSTRUCTED WITH CONCRETE APPROACH PAVEMENT ONLY WHEN DRAIN BASINS ARE REQUIRED. TYPE A CURBS WILL BE CONSIDERED AS INCIDENTAL, AND WILL BE INCLUDED IN THE PAYMENT FOR CONCRETE APPROACH PAVEMENT.

FOR SHOULDER PAVING AND DRAIN BASINS AT BRIDGE ENDS, SEE STANDARD DRAWING NUMBER 609.40.

FOR TYPE A BARRIER CURBS, STANDARD 2" EXPANSION JOINTS, LONGITUDINAL JOINTS AND TONGUE AND GROOVE JOINTS, SEE STANDARD DRAWINGS NO. 502.00 AND 609.00.

FOR BRIDGE APPROACH SLAB, SLEEPER SLAB, AND JOINT FILLER DETAILS, SEE BRIDGE PLANS.

A PRE-FORMED FIBER EXPANSION JOINT MATERIAL SHALL BE PLACED WITH CONCRETE APPROACH PAVEMENT AND MEET THE REQUIREMENTS OF SECTION 1057 OF THE STANDARD SPECIFICATION FOR HIGHWAY CONSTRUCTION.

COST OF FURNISHING AND PLACEMENT OF 4" TYPE 5 AGGREGATE BASE AND 3" JOINT FILLER IS INCLUDED IN CONTRACT UNIT BID PRICE FOR CONCRETE APPROACH PAVEMENT.



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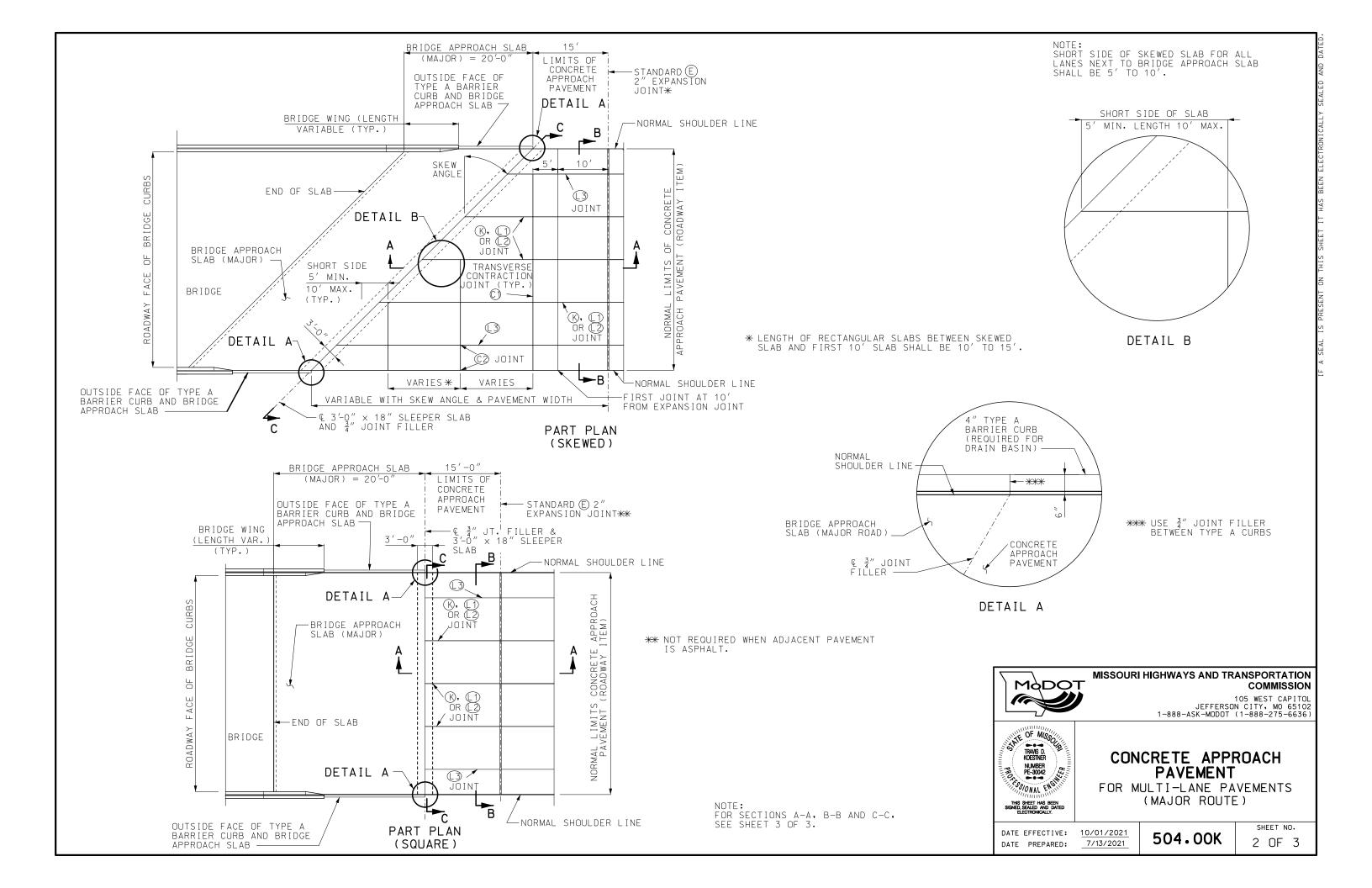
### CONCRETE APPROACH PAVEMENT

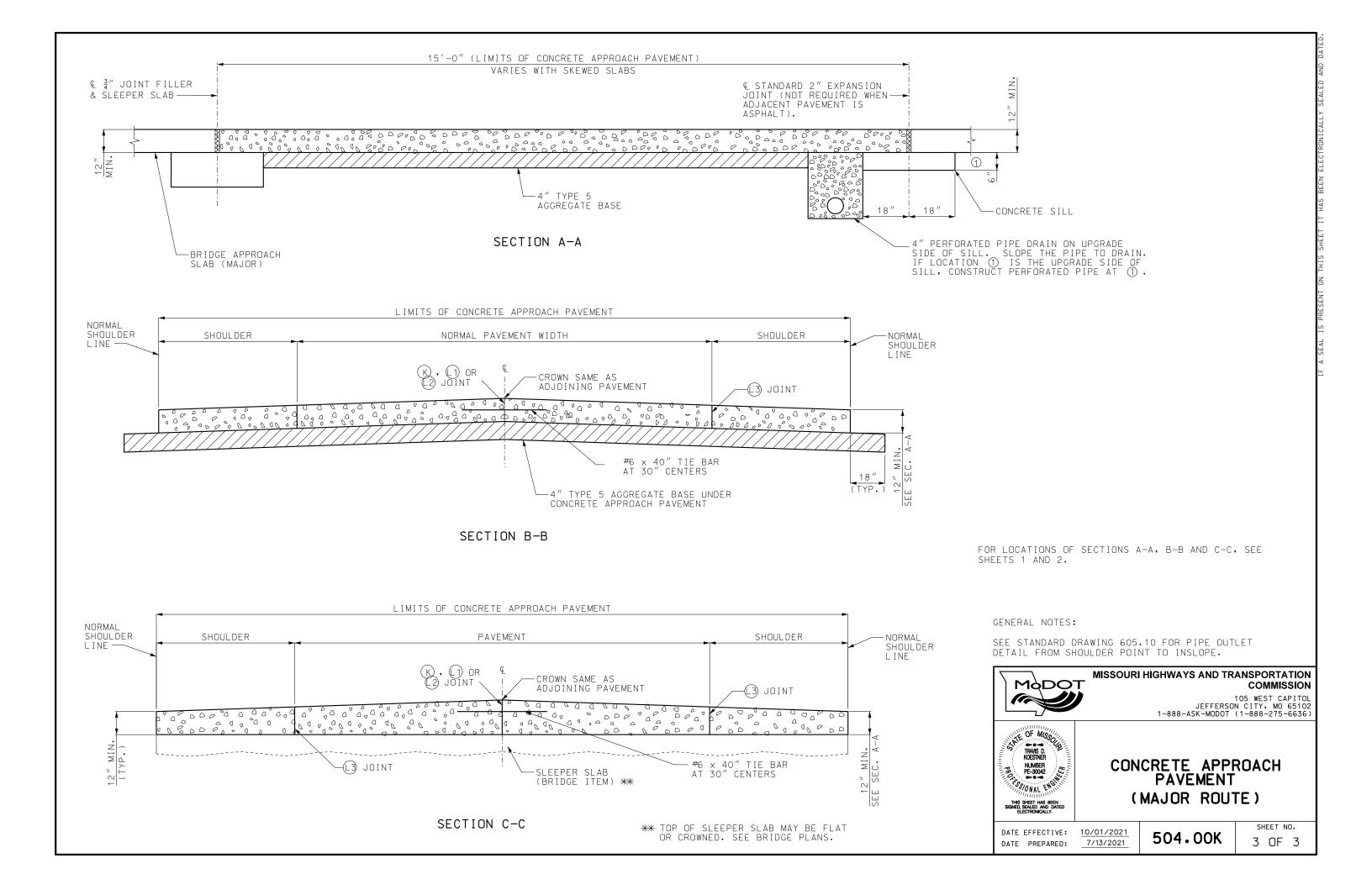
FOR TWO-LANE PAVEMENTS (MAJOR ROUTE)

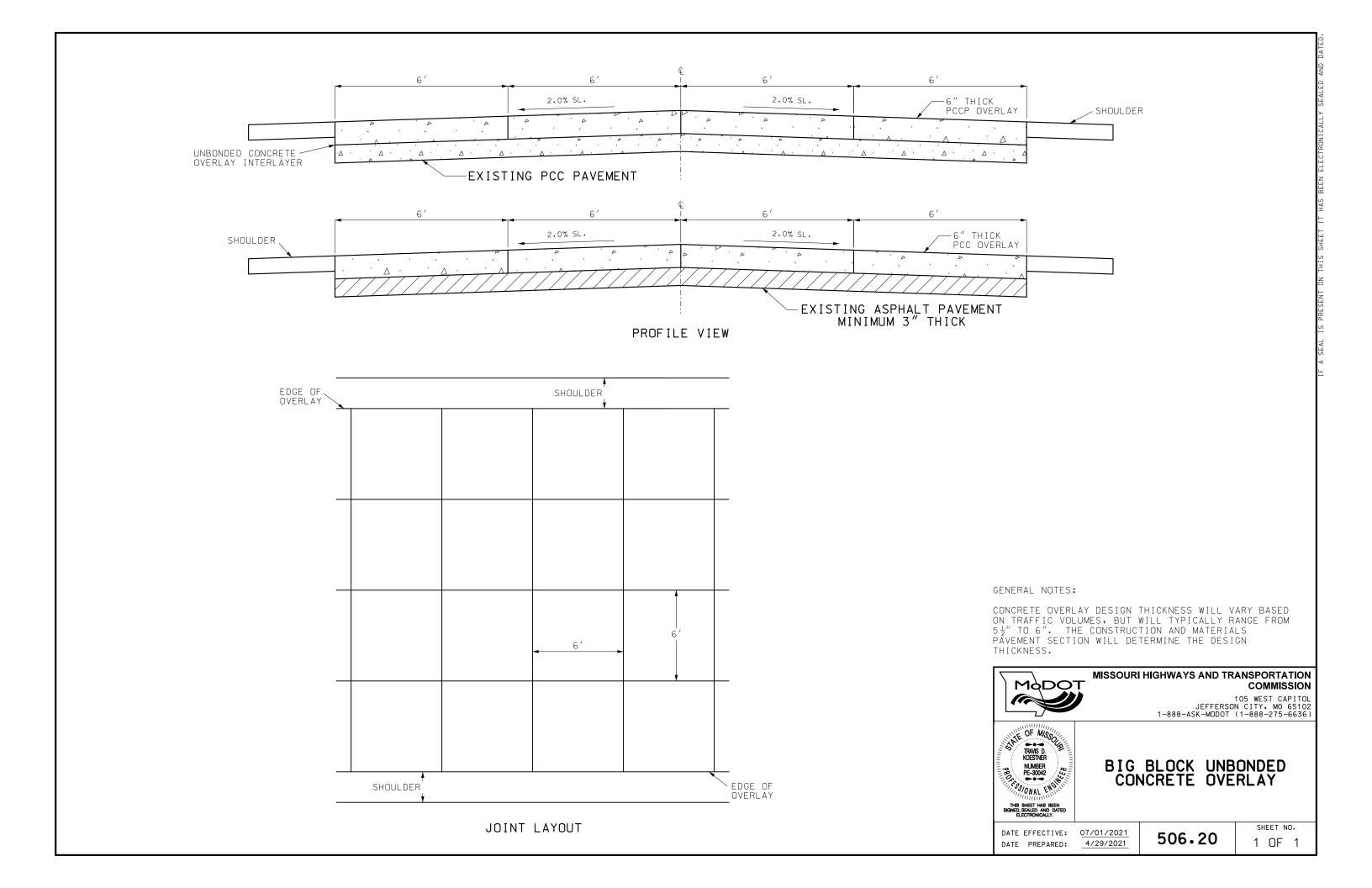
DATE EFFECTIVE: 10/01/2021 DATE PREPARED:

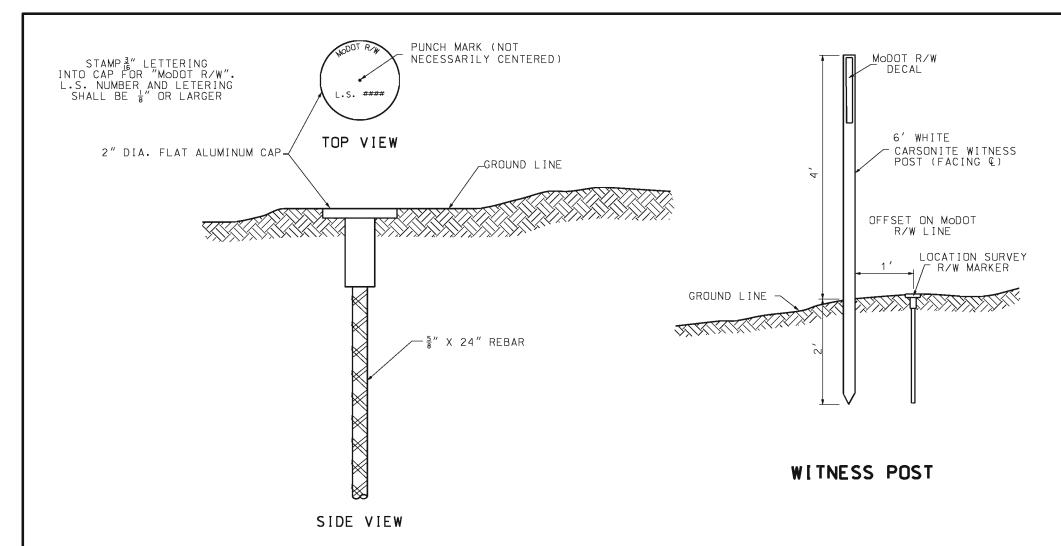
7/13/2021

504.00K

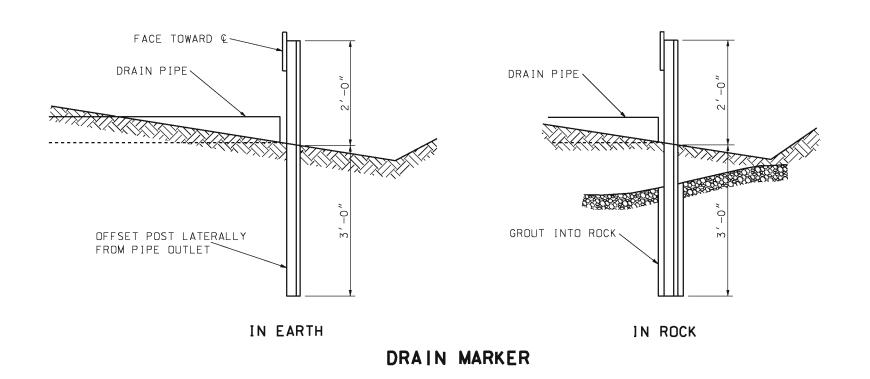








# LOCATION SURVEY RIGHT-OF-WAY MARKER



GENERAL NOTES:

WHEN STEEL AND LOCATION SURVEY R/W MARKERS ARE NOT SUITABLE DUE TO NATURAL GROUND FEATURES OR MAN-MADE STRUCTURES, ALTERNATIVE MONUMENTATION (IN COMPLIANCE WITH THE APPROVED MONUMENTATION, AS SPECIFIED BY THE MISSOURI MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS) MAY BE SET.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

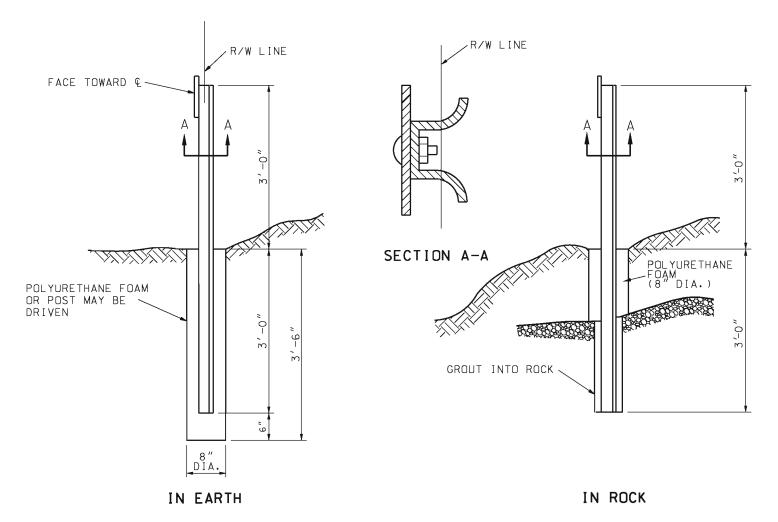
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# RIGHT-OF-WAY AND DRAIN MARKERS

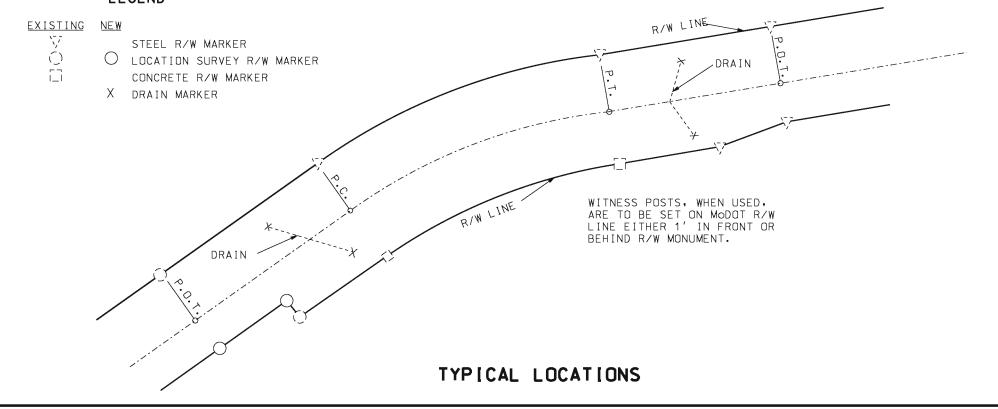
SHEET NO. 1 OF 2

DATE EFFECTIVE: 01/01/2003 602.00D DATE PREPARED:



# STEEL RIGHT-OF-WAY MARKER

### LEGEND





# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY: MO 65102 1-888-ASK-MODOT (1-888-275-6636)

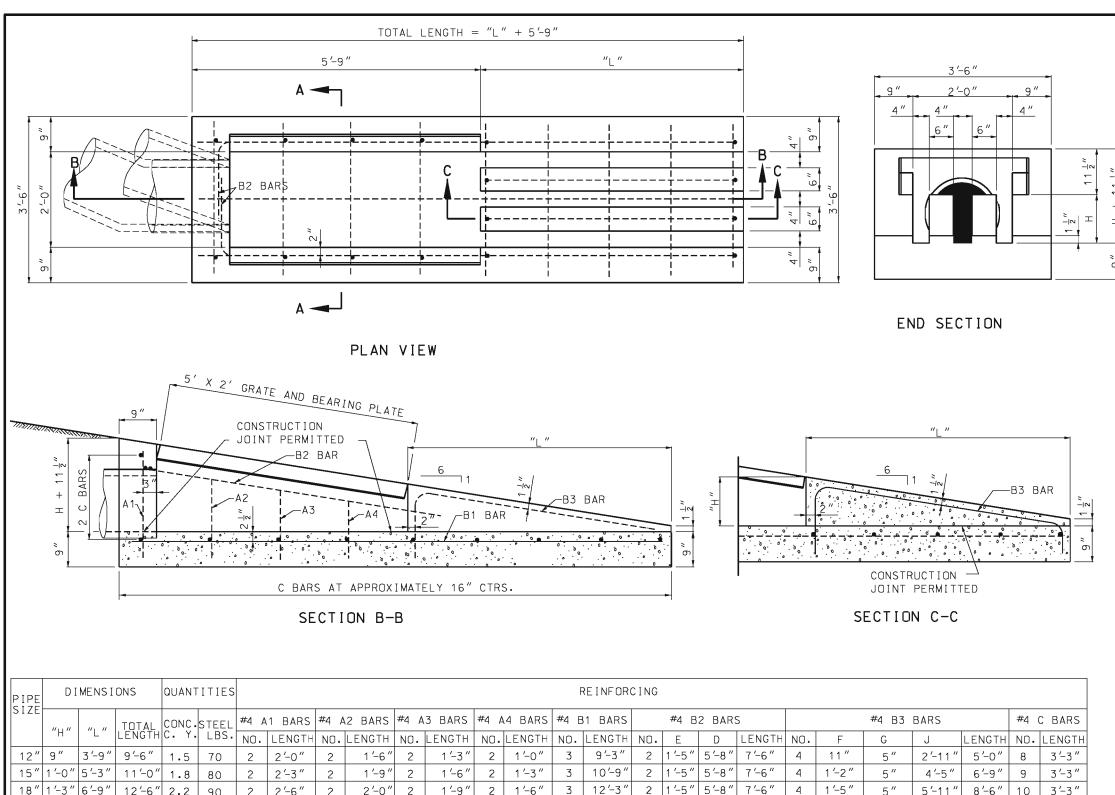


RIGHT-OF-WAY AND DRAIN MARKERS

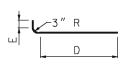
THIS SHEET HAS BEE! SIGNED, SEALED AND DA ELECTRONICALLY.

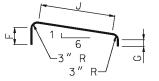
DATE PREPARED: 01/01/2003 8/21/2009 602.00D

D 2 OF 2



PIPE		MENSI	ONS	QUAN-	TITIES	;	RE I NF ORC I NG																			
SIZE		,,,,,,			STEEL	#4 A	1 BARS	#4 /	A2 BARS	#4 4	3 BARS	#4 A	4 BARS	#4 E	B1 BARS		#4 B	2 BARS	5			#4 B3	BARS		#4 (	C BARS
	"H"	"L"	LENGTH	C. Y.	LBS.	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	E	D	LENGTH	NO.	F	G	J	LENGTH	NO.	LENGTH
12"	9"	3′-9″	9′-6″	1.5	70	2	2′-0″	2	1 ′-6 ″	2	1 ′-3 ″	2	1 ′-0 "	3	9′-3″	2	1 ′-5 ″	5′-8″	7′-6″	4	11"	5"	2′-11″	5′-0″	8	3′-3″
15"	1 ′-0 ″	5′-3″	11′-0″	1.8	80	2	2′-3″	2	1 ′-9 ″	2	1 ′-6 ″	2	1 ′-3 ″	3	10′-9″	2	1 ′-5 ″	5′-8″	7′-6″	4	1 ′-2 ″	5″	4 ′-5 ″	6′-9″	9	3′-3″
18"	1 ′-3 ″	6′-9″	12′-6″	2.2	90	2	2′-6″	2	2′-0″	2	1′-9″	2	1 ′-6 ″	3	12′-3″	2	1 ′-5 ″	5′-8″	7′-6″	4	1 ′-5 ″	5"	5′-11″	8 '-6 "	10	3′-3″
21"	1′-6″	8′-3″	14′-0″	2.6	100	2	2′-9″	2	2′-3″	2	2′-0″	2	1 ′-9 ″	3	13′-9″	2	1 ′-5 ″	5′-8″	7′-6″	4	1 ′-8 ″	5"	7′-5″	10′-3″	11	3′-3″
24"	1 '-9 "	9'-9"	15′-6″	3.0	110	2	3′-0″	2	2′-6″	2	2′-3″	2	2′-0″	3	15′-3″	2	1 '-5 "	5′-8″	7′-6″	4	1′-11″	5"	8′-11″	12′-0″	12	3′-3″





B2 BARS

**B3 BARS** 

BENDING DETAILS

### GENERAL NOTES:

USE RIGHT ANGLE HEADWALL FOR ALL INSTALLATIONS. SKEW PIPE BY USING A BEVELED END OR ELBOW ON PIPE. IN SPECIAL CASES, HEADWALL MAY BE TURNED TO FIT PIPE SKEW AND 1V TO 6H SLOPE WARPED TO FIT HEADWALL.

3′-6″

A BARS

-B1 BARS

GRATE AND BEARING PLATE

SECTION A-A

ALL CONCRETE SHALL BE CLASS "B".

B2 BAR

C BARS

THIS DRAWING AND THE CONCRETE QUANTITIES SHOWN ARE BASED ON THE USE OF CONCRETE PIPE. QUANTITIES OF CONCRETE SHOWN WILL BE USED FOR PAYMENT REGARDLESS OF ANY QUANTITY CHANGES NECESSARY DUE TO THE USE OF ANY OTHER TYPE PIPE SPECIFIED OR PERMITTED.

FLOW LINE OF HEADWALL IS TO BE PLACED HORIZONTALLY.

#### PRECAST NOTES:

THE CONTRACTOR MAY, SUBJECT TO APPROVAL OF THE ENGINEER, FURNISH PRECAST UNITS IN LIEU OF CAST-IN-PLACE. IF A PRECAST UNIT IS FURNISHED, IT SHALL CONFORM IN ALL RESPECTS TO THE THE REQUIREMENTS FOR CAST-IN-PLACE UNITS INCLUDING DIMENSIONS AND REINFORCEMENT, EXCEPT THAT THE FORMS MAY BE TAPERED TO FACILITATE REMOVAL OF THE UNIT FROM THE FORMS. SHOP DRAWINGS OF THE PRECAST UNIT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FIRST USE OF THE PRECASTING FORMS.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

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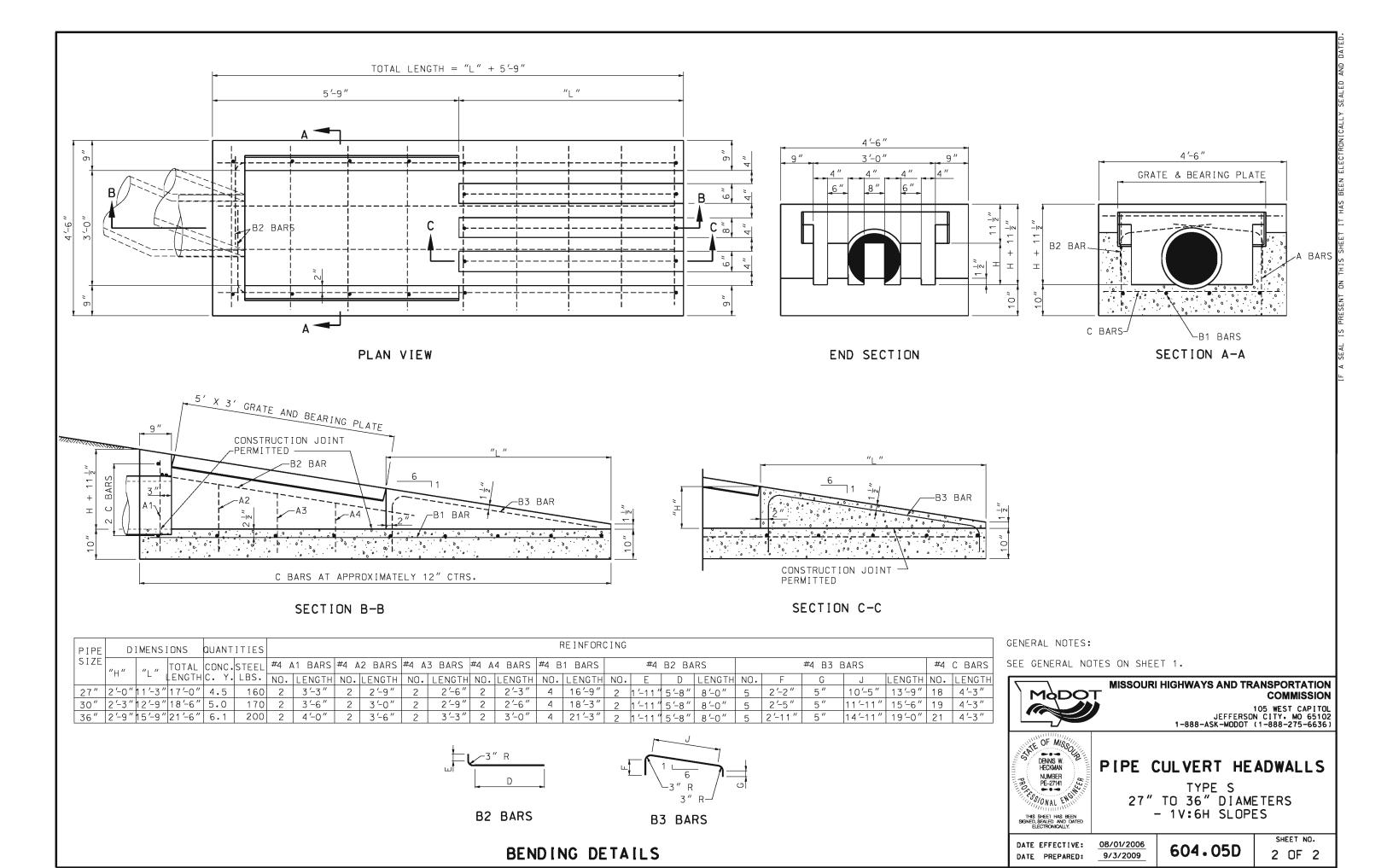
# PIPE CULVERT HEADWALLS

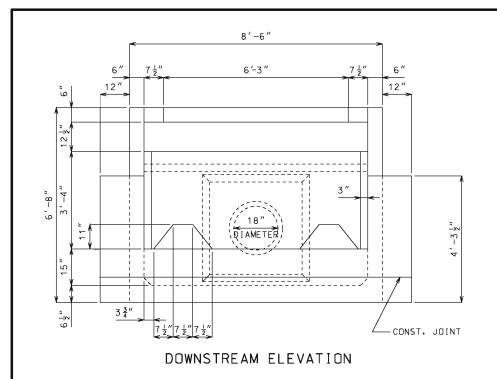
TYPE S 12" TO 24" DIAMETERS - 1V:6H SLOPES

DATE EFFECTIVE: DATE PREPARED:

08/01/2006 9/3/2009

604.05D





——SYMM. ABT. €

3-#4-B1 9'

12" CTS.

3-#4-D2 ─

#4-A4

A -

HALF HORIZONTAL

SECTION

8-#4-A1 AT 12" CTS. 9'

∠<sub>#4-J2</sub>

#4-F1-

- **#**4-B2

9" 3-#4-B1

AT 12" CTS.

18"

9" 7-#4-D1 AT 12" CTS.

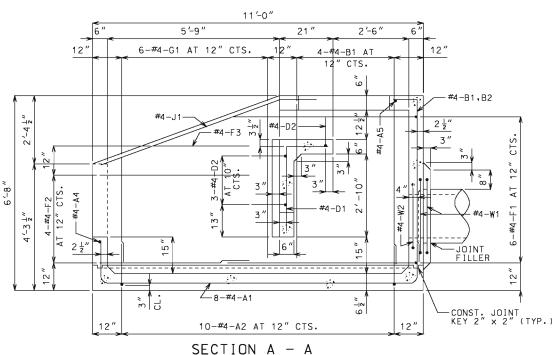
3'-9"

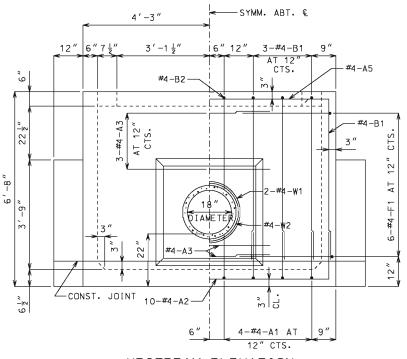
5′-3″

HALF PLAN

#4-J1-

12" 6'





#### UPSTREAM ELEVATION

### NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.

SYMM. ABT. €

### ESTIMATED QUANTITIES TOTAL CLASS B CONCRETE CU. YD. REINFORCING STEEL LBS. 490

#### GENERAL NOTES:

#### DESIGN UNIT STRESSES

CLASS B CONCRETE f'c = 3.000 psiREINFORCING STEEL (GRADE 60) fy = 60,000 psi

#### REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1 UNLESS SHOWN OTHERWISE.

#### DIMENSIONS

TO SCALE. FOLLOW DIMENSIONS.

0-13 5-9

(INCREMENT =  $4\frac{5}{8}$  INCHES)

4-0

5-8

3-9

7-5

2-4

0-23

3-10 3 2-1 2

					DIME	1311	3113			
					DRA₩	I NG:	S AR	ΕN	101	
)				l.						
Ť			_	ĺ						
î			12"							
		١.	1		EQ'D	M.	ARK NO.	Š.	VARIES (V)	
	4-#4-B1 AT	12" CTS			NO. REQ'D	SIZE	MARK	SHAPE NO.	VARIE	
2"	#	-			8	4	Α1	11		ĺ
	4		s.		10	4	A2	11		
		1	10-#4-A2 AT 12" CTS		5	4	A3	20		
	12"	١	2		1	4	Α4	20		
	_		-		1	4	A5	20		
			Α		14	4	В1	19		
В	STS	:	4Z		2	4	В2	19		
	×	;	47		7	4	D1	19		
B	ή 6-#4-61 AT 12" CTS.		ő		4	4	D2	11		
J	Η	'	_		1	4	D3	15		
	-				2	4	D4	14		
	4-6				2	4	E1	23		
	#				12	4	F 1	19		
<b>#</b> 4-	-F2				8	4	F2	19		
_	,		_\	ľ	2	4	F3	20		
_		1	12"		12	4	G1	20	٧	
7			_							
/	ž		1	ľ	2	4	J1	20		
					2	4	J2	19		١

2 4 W/1 16

4 W2 16

															DEMOTING DIAGRANG
					CO	MPLETE	BILL	OF REI	NF ORC I	NG STE	.EL				BENDING DIAGRAMS
0,0	MARK	•	2				DI	MENSIC	INS			INAL	UAL	СНТ	
REQ'I	MO.	닖	IES	EACH	В	С	D	Е	F	н	К	NO EN	ACT	WEI	
Š	SIZE	SHA	VARI	Š	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	FT.IN.	LBS.	SHAPE 11 SHAPE 14 SHAPE 15
8	4 A1	11				0-16 🕯	10-7	0-17 3				13-5	13-3	71	Vertical B
10	4 A2	11				0-18 4	8-0	0-18 4				11-1	10-10	72	l m led
5	4 A3	20			4-6							4-6	4-6	15	SHAPE 20
1	4 A4	20			10-3							10-3	10-3	7	SHAPE 16 SHAPE 19  Detailing
1	4 A5	20			8-3							8-3	8-3	6	Dimension N
14	4 B1	19			5-9	0-9						6-6	6-4	59	
2	4 B2	19			2-11	0-9						3-8	3-6	5	K   C   F   90°
7	4 D1	19			2-11	0-16						4-3	4-2	19	SHAPE 23 STANDARD HOOKS
4	4 D2	11				0-201	8-0	0-201				11-5	11-3	30	ALL STANDARD HOOKS AND RENDS OTHER THAN
1	4 D3	15			2-1 ½	2-11 ½	2-1 ½	0-21 <del>5</del>	0-13 ½	0-21 5	0-13 ½	7-3	7-2	5	ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE
2	4 D4	14			0-12	0-6	2-1 ½			0-21 등	0-13 ½	3-8	3-6	5	AS FOR 90 DEG. STANDARD HOOKS.
2	4 E1	23			0-13	4-03				0-9 3	0-9	5-1	5-1	7	HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SH
12	4 F1	19			2-10 ½	6-4 🖁						9-3	9-1	73	NOMINAL LENGTHS ARE BASED ON OUT TO OUT

6-10 6-9 4-0

5-8

3-9

7-5

5-11

8-2

4-0

5-8

3-9

7-5

6-0

8-2

6-11 6-11

5

10

11

. SHEET.

OMMINAL LENGTHS ARE BASED ON OUT TO OUT

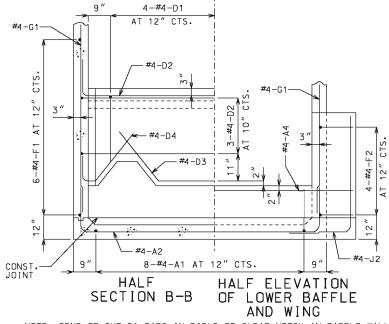
DIMENSIONS SHOWN IN BENDING DIAGRAMS AND
ARE LISTED FOR FABRICATORS USE.

ENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

- BAR DIMENSIONS VARY IN EQUAL IN-CREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.

OF MISSO DENNIS W. HECKMAN NUMBER



NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

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MODOT

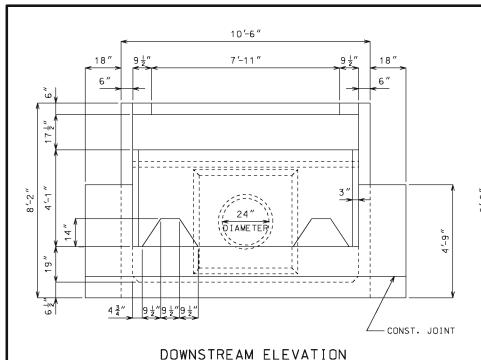
# PIPE CULVERT HEADWALL

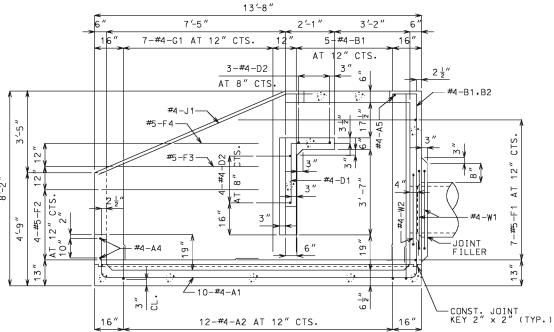
ENERGY DISSIPATOR (IMPACT TYPE) FOR 18" CONCRETE PIPE

DATE EFFECTIVE: DATE PREPARED:

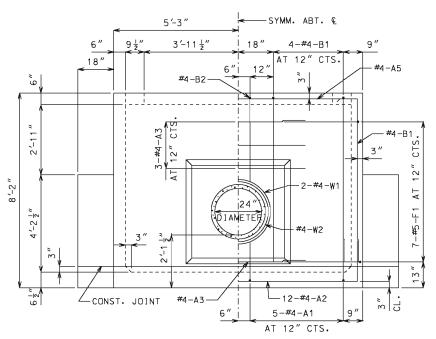
07/01/2001 9/3/2009

604.10E





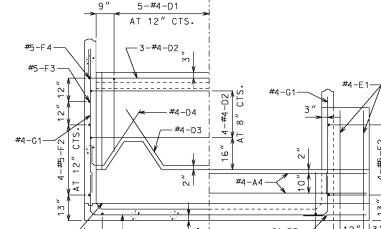
SECTION A - A



#### UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.

−SYMM. ABT. €



#4-A2

HALF HALF ELEVATION SECTION B-B OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

10-#4-A1 AT 12" CTS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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PIPE CULVERT HEADWALL ENERGY DISSIPATOR (IMPACT TYPE) FOR 24" CONCRETE PIPE

DATE EFFECTIVE: DATE PREPARED:

07/01/2001 9/3/2009

604.11E

SHEET NO. 1 OF 1

#### GENERAL NOTES:

#### DESIGN UNIT STRESSES

4 J1 20

4 W1 16

1 4 W2 16

9-6

2-9

2-5

CLASS B CONCRETE f'c = 3.000 psiREINFORCING STEEL (GRADE 60) fy = 60.000 psi

#### REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1 UNLESS SHOWN OTHERWISE.

#### DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

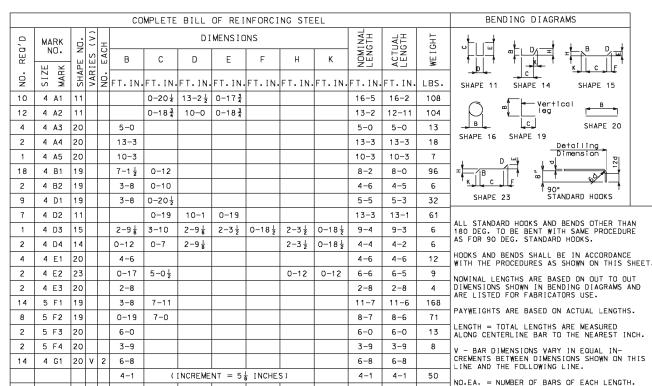
ESTIMATED	QUANTITIES	
ITEM		TOTAL
CLASS B CONCRETE REINFORCING STEEL	CU. YD. LBS.	9.5 820

SHAPE 15

CONST.

			9" 4-#4-B1 18" 18" 4-#4-B1 9"  AT 12" CTS 6" AT 12" CTS 4"
	,9		
	5'-3"	6" 19" 2'-4½" 9½"	#4-B2 #4-B2
0	7'-5"	#4	B 9½" 9 -#4-D1 AT 12" CTS.  #5-F2  #4-E1  #4-E1
<b>↓</b>	, e		18" 6" 4'-9" A 12" 3"
			10-#4-A1 AT 12" CTS 9"

HALF HORIZONTAL HALF PLAN SECTION



9-6

9-6

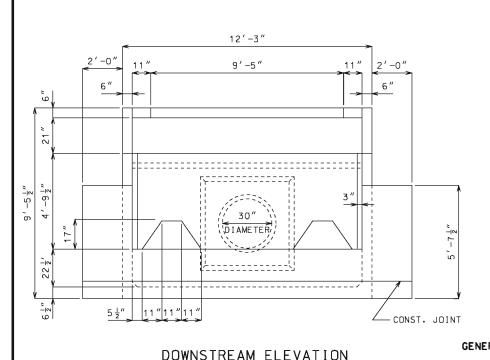
8-6 8-6

9-6

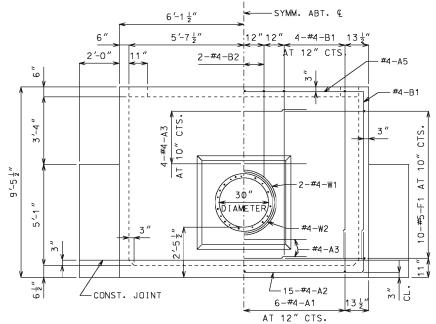
9-6

13

13



# 16'-0" 2'-5½" 8'-9 ½" 3'-9" 12" 9-#4-G1 AT 12" CTS. d-#4-B1 AT 12" CTS. 3-#4-D2 AT 8" CTS — #4-B1,B2 -JOINT FILLER — 11 – #4 – Δ1 -CONST, JOINT KEY 2" x 2" (TYP.) 15-#4-A2 AT 12" CTS. GENERAL NOTES: SECTION A - A



#### UPSTREAM ELEVATION

<--SYMM. ABT. €

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.

#### f'c = 3.000 psiCLASS B CONCRETE REINFORCING STEEL (GRADE 60) fy = 60.000 psi REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1 UNLESS SHOWN OTHERWISE.

DESIGN UNIT STRESSES

DIMENSIONS DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

7-0 <del>7</del>

8-5 ₹

10-11

3-6

2-11

18 | 4 G1 | 20 V | 2 | 5-1 \frac{3}{8}

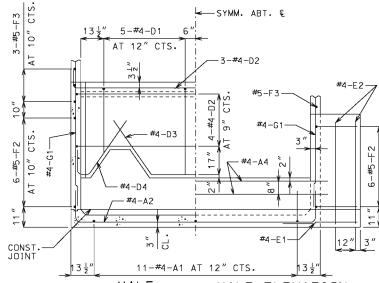
4 J1 20

4 W/1 16

1 4 W2 16

ESTIMATED QUANTIT	IES	
ITEM		TOTAL
CLASS B CONCRETE REINFORCING STEEL		13.2 1.170

BS.	1.170	1	١
		١	,
		10,	,
MS		′	١.
B		6-#5-F2	10" CTS.
جها اجو	C   F   PE 15	·-9	AT 1(
al <u>r<del>*</del></u>	В	11,	,
SHA	APE 20		
tallin mensio	12d D	JOI	
ć,			
DARD H	T		
	TUED TU		NOTE



HALF HALF ELEVATION SECTION B-B OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



PIPE CULVERT HEADWALL

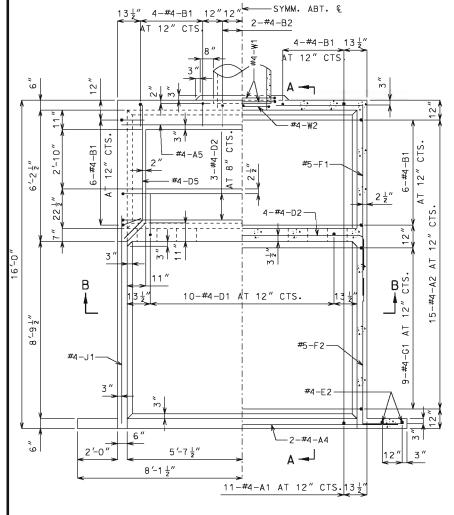
ENERGY DISSIPATOR (IMPACT TYPE) FOR 30" CONCRETE PIPE

DATE EFFECTIVE: DATE PREPARED:

07/01/2001 9/3/2009

604.12E

SHEET NO. 1 OF 1



HALF PLAN HALF HORIZONTAL SECTION

COMPLETE BILL OF REINFORCING STEEL BENDING DIAGRAM DIMENSIONS NO. В D Ε HE NOTE TO THE STATE OF THE STA SHAPE 11 4 A1 2-0 15-6 0-20 1 19-3 19-1 140 15 4 A2 0-20 1 11-10 0-20 1 15-3 15-1 151 M 6 4 A3 20 5-4 21 5-4 5-4 4 A4 20 13-3 | 13-3 18 13-3 4 A5 20 11-9 11-9 | 11-9 20 4 B1 19 8-5 1 0-13 9-7 9-5 126 4 B2 19 4-0 0-13 5-1 5-0 10 SHAPE 23 4-4 2-01 10 4 D1 19 6-5 6-3 42 4 D2 11 0-12 | 11-10 | 0-12 13-10 13-8 64 4 D3 |15 2-11 | 4-7 | 2-11 2-6 0-18 2-6 0-18 10-5 10-4 0-12 0-7 3-0 4-7 4-5 4 D4 |14| 2-6 0-20 2 | 4 D5 | 23 | 0-18 3 5-7 0-13 0-13 7-1 2 4 E1 20 3-0 3-0 4 4 E2 20 5-3 5-3 5-3 14  $8-8\frac{3}{6}$   $4-2\frac{1}{2}$ 20 | 5 F1 | 19 12-11 12-9 266 12 5 F2 19 2-1

(INCREMENT = 24 INCHES)

(INCREMENT = 5 INCHES)

SHAPE 14 \_c\_ SHAPE 16 SHAPE 19 ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS. HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET

NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS. 8-1 10-2 10-1 126 6 5 F3 20 V 2 3-0 78

3-1

7-1

8-5

3-1

7-1

8-5

10-11 10-11

11-10 11-10

10-0 10-0

81

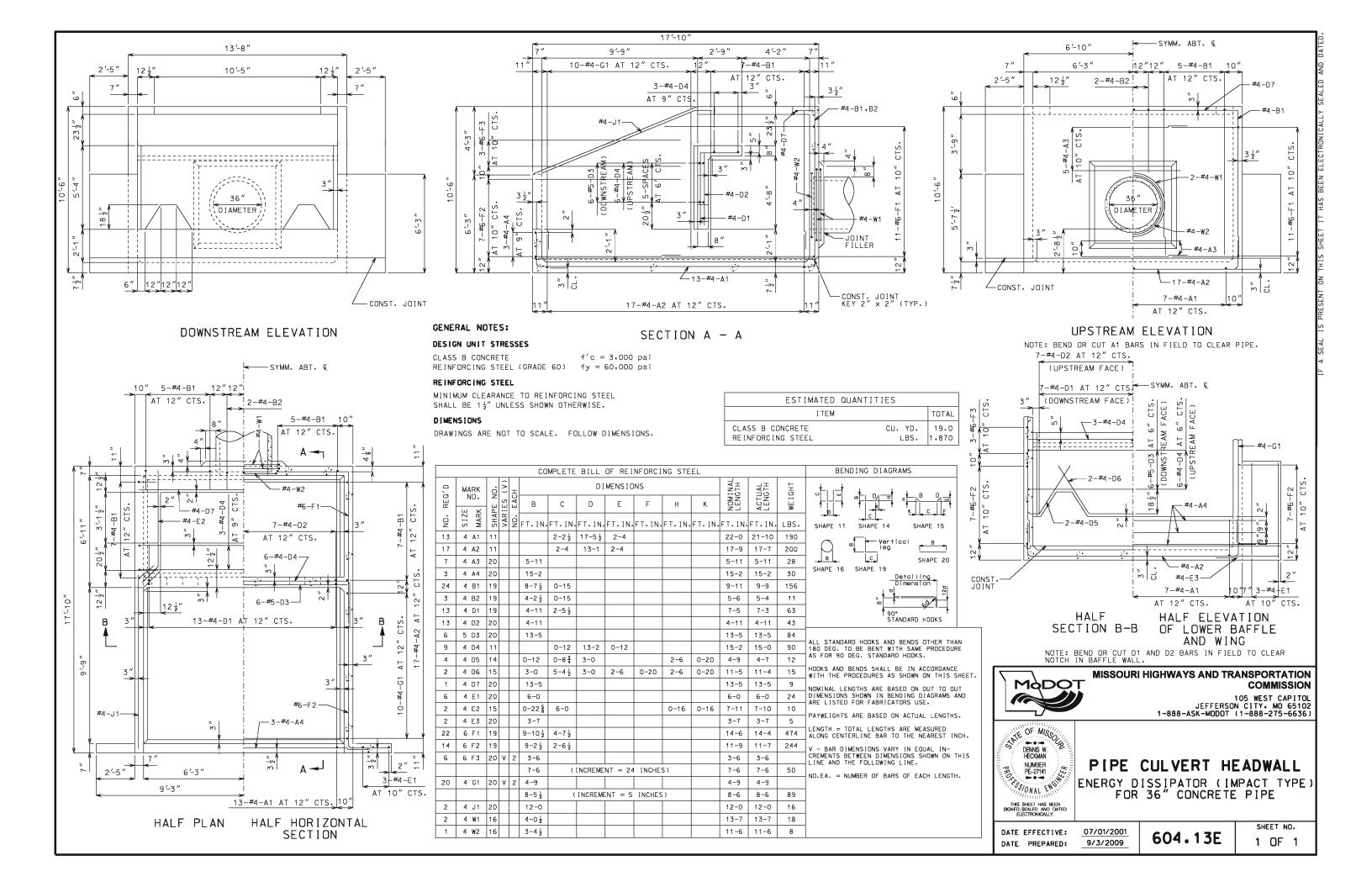
15

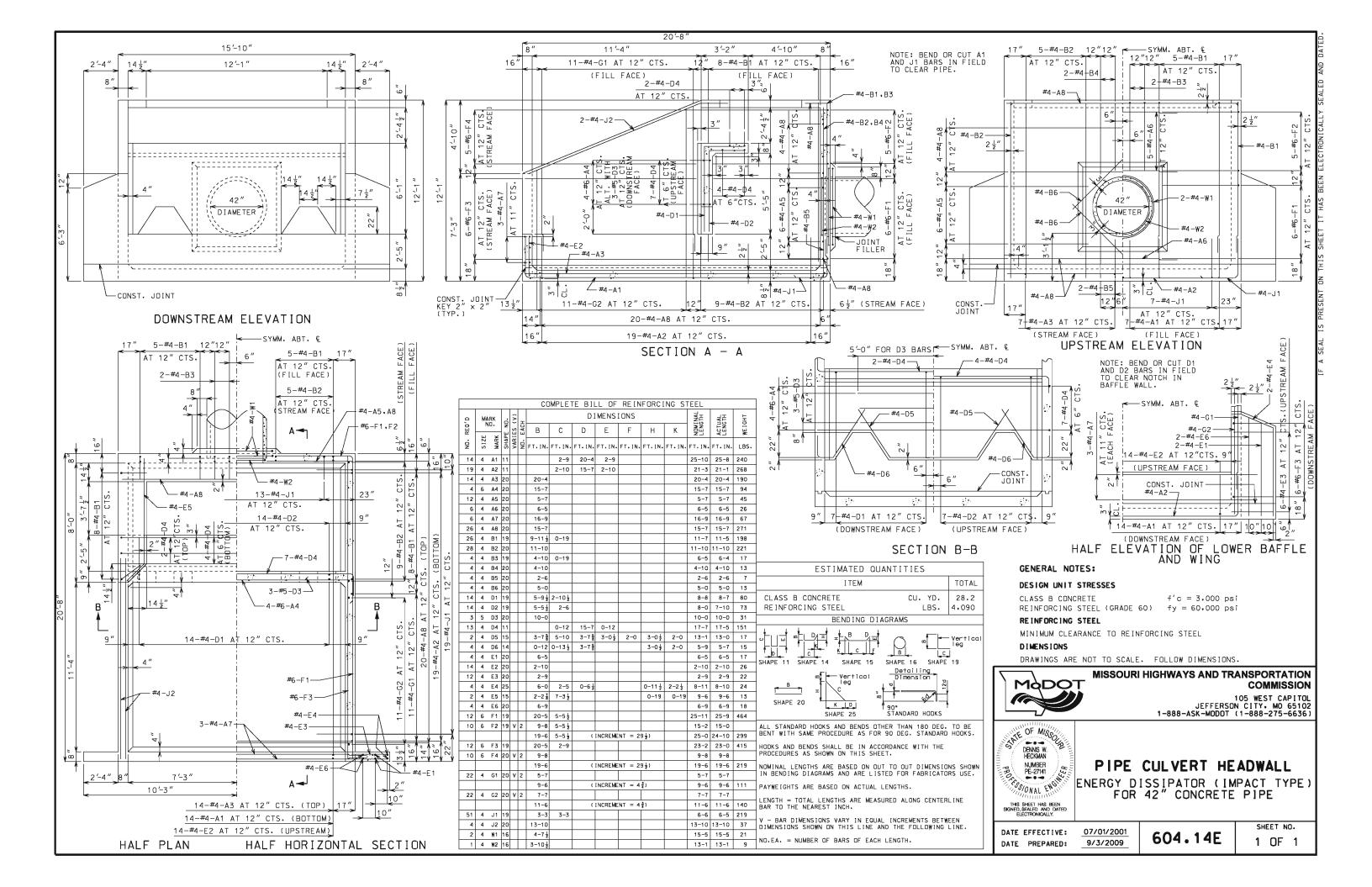
16

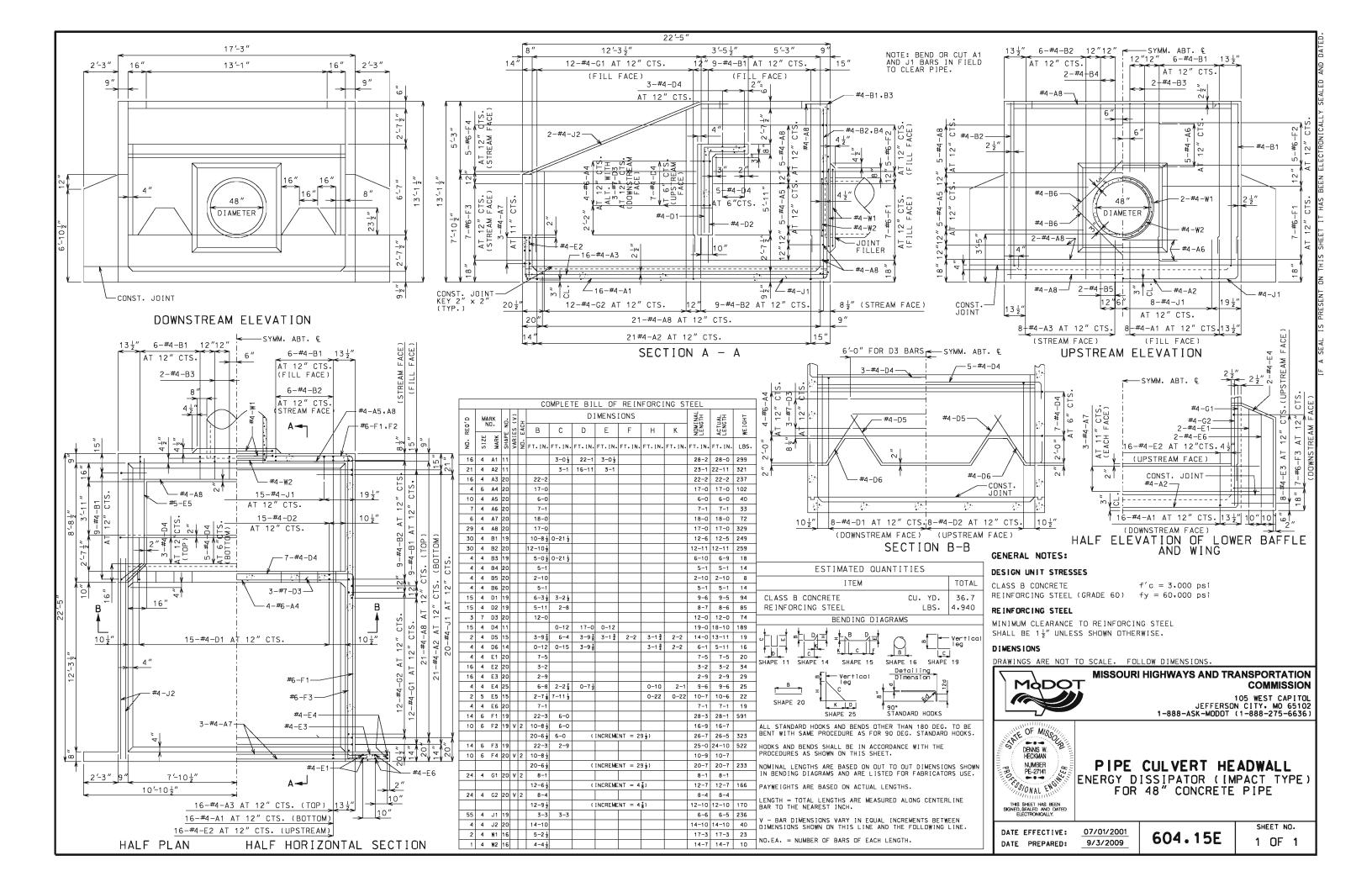
LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

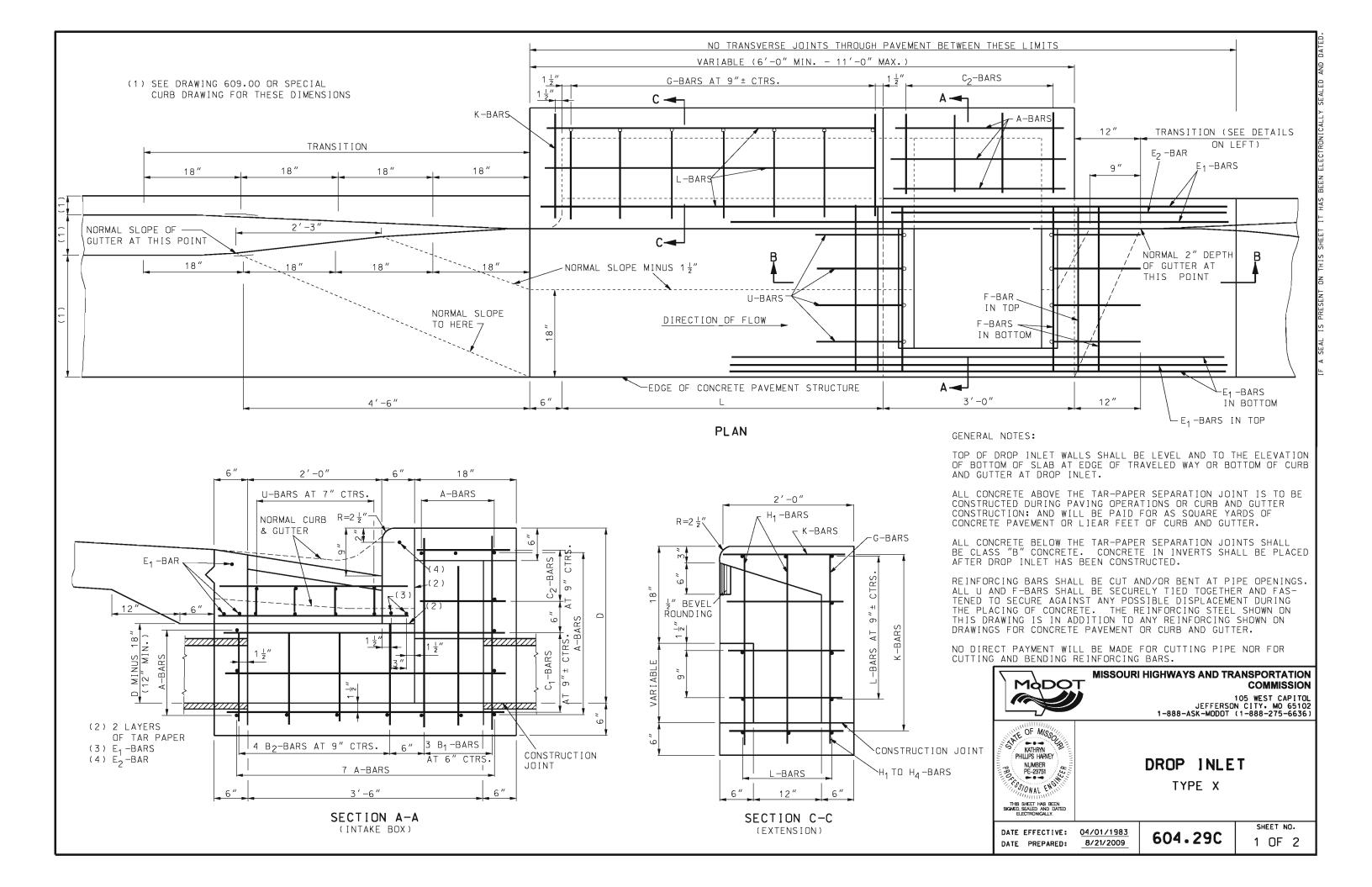
V - BAR DIMENSIONS VARY IN EQUAL IN-CREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.









BAR BILL - EXTENSION												
LENG EXT			2′-6″	5	′-0″	7′-6″						
MARK	SIZE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH					
G	#5	4	3′-3″	7	3′-3″	10	3′-3″					
H 1	#4	4	2'-6"	4	2′-6″	4	2′-6″					
Н <sub>2</sub>	#4	2	2′-9″	3	2′-9″	3	2′-9″					
Н 3	#4			2	3′-0″	3	3′-0″					
H 4	#4					2	3′-3″					
Н <sub>5</sub>	#4	1	1 ′ -0 ″	1	1 ′ -0 ″	1	1 ′ -0 ″					
Н <sub>6</sub>	#4	2	1'-3"	3	1'-3"	3	1′-3″					
H 7	#4			2	1′-6″	3	1 ′ -6 ″					
Н 8	#4					2	1′-9″					
К	#4	7	1′-9″	10	1'-9"	13	1′-9″					
L	#4	11	2'-9"	11	5′-3″	11	7′-9″					
DOWEL BAR	#4	8	1 ′ -0 ″	9	1'-0"	10	1 ′ -0 ″					

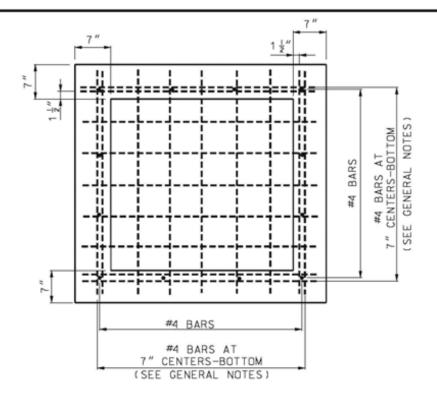
ADDITIO	YDS. & L ONS TO B ACH EXTE	E MADE
LENGTH	CU.YDS.	LBS.
2′-6″	0.39	60.0
5′-0″	0.70	101.4
7′-6″	1.04	143.8

CU. YDS. DEDUCTION TO BE MADE FOR PIPE OPENING											
12" 15" 18" 24"											
0.03	0.04	0.05	0.09								

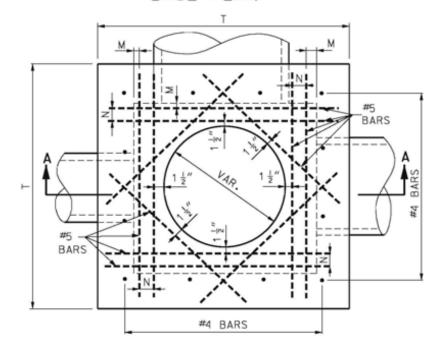
DEDUCTIO	RETE AND NS TO BE XTENSION	MADE FOR
9" X 12"	12" X 12"	15" X 12"
0.01 C.Y.	0.02 C.Y.	0.02 C.Y.
2.5 LBS.	3.7 LBS.	4.0 LBS.

								BAR	BIL	L - IN	NTAKE	E BOX								
			Α-	-BARS	В <sub>1</sub> -	-BARS	В2-	-BARS	C <sub>1</sub> -	-BARS	c <sub>2</sub>	-BARS	E 1	-BARS	E 2	-BARS	F-	BARS	U-	-BARS
D	CONC. CU. YDS.	STEEL LBS.	IN E	SVERSE BOTTOM S & TOP		TICAL IN ALLS		TICAL IN ALLS	IN E	TUDINAL BOTTOM SIDE	LONG I I N AN	TUDINAL SIDE D TOP		TUDINAL IN TTER		ITUDINAL IN JTTER	I	NSVERSE IN JTTER	1	IN JTTER
			NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
2'-6"	0.82	131	15	2'-9"	8	2'-9"	10	1'-3"	8	4'-3"	6	1'-3"	5	7′-0″	1	4'-9"	6	2'-9"	8	2'-9"
2′-9″	0.88	134	15	2'-9"	8	3′-0″	10	1′-6″	8	4'-3"	6	1'-3"	5	7′-0″	1	4'-9"	6	2'-9"	8	2'-9"
3′-0″	0.94	137	15	2'-9"	8	3′-3″	10	1'-9"	8	4'-3"	6	1'-3"	5	7′-0″	1	4'-9"	6	2'-9"	8	2'-9"
3'-3"	1.00	140	15	2'-9"	8	3′-6″	10	2'-0"	8	4'-3"	6	1'-3"	5	7′-0″	1	4'-9"	6	2'-9"	8	2'-9"
3′-6″	1.06	152	17	2'-9"	8	3'-9"	10	2'-3"	10	4′-3″	6	1'-3"	5	7′-0″	1	4'-9"	6	2'-9"	8	2'-9"
3′-9″	1.12	155	17	2'-9"	8	4'-0"	10	2'-6"	10	4′-3″	6	1'-3"	5	7′-0″	1	4'-9"	6	2'-9"	8	2'-9"
4′-0″	1.18	158	17	2'-9"	8	4'-3"	10	2′-9″	10	4'-3"	6	1'-3"	5	7′-0″	1	4′-9″	6	2'-9"	8	2'-9"
4'-3"	1.24	170	19	2'-9"	8	4'-6"	10	3′-0″	12	4'-3"	6	1'-3"	5	7′-0″	1	4′-9″	6	2'-9"	8	2'-9"
4′-6″	1.30	173	19	2'-9"	8	4'-9"	10	3′-3″	12	4'-3"	6	1'-3"	5	7′-0″	1	4′-9″	6	2'-9"	8	2'-9"
4′-9″	1.36	176	19	2′-9″	8	5′-0″	10	3′-6″	12	4′-3″	6	1'-3"	5	7′-0″	1	4′-9″	6	2'-9"	8	2'-9"
5′-0″	1.42	189	21	2′-9″	8	5'-3"	10	3′-9″	14	4′-3″	6	1'-3"	5	7′-0″	1	4′-9″	6	2'-9"	8	2'-9"
CONCD	ETE OUA	NITITIC	C INC	Y LIDE O	15 0	1 VDC [		NVEDT		D.C. #4			•					•		

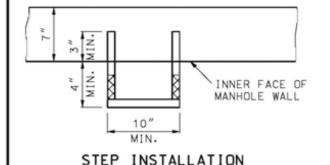
CONCRETE QUANTITIES INCLUDE 0.15 CU.YDS. FOR INVERT ALL BARS #4 CONCRETE PAVEMENT 2'-6" F-BAR F-BAR ROUNDING 1 ′ -6 ″ U-BARS U-BARS-E<sub>1</sub> -BARS BEARING PLATE (SEE OTHER DRAWINGS) 2-LAYERS F-BARS 2-LAYERS
OF TAR PAPER E<sub>1</sub>-BARS F-BARS CONCRETE PAVEMENT CONCRETE GUTTER MINUS 2 LAYERS OF TAR PAPER 2'-6" 2'-6' 5'-0" 12" 2′-9′ CONSTRUCTION / JOINT B<sub>2</sub>-BARS AT 9" ± CTRS. OPENING THROUGH WALL OF GRATE INLET C1-BARS AT 9" ± CTRS. 2'-0" SECTION SHOWING DETAILS OF OPENING AND SECTION B-B DEPRESSION IN PAVEMENT OR GUTTER H<sub>1</sub> -BARS L-BARS-MISSOURI HIGHWAYS AND TRANSPORTATION MODOT COMMISSION PLUS 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) ERIC E. SCHROETER NUMBER DROP INLET PE-20-10″± TYPE X G-BARS U-BARS H<sub>5</sub> TO H<sub>8</sub> BARS AT 10" ± CTRS. BENDING DIAGRAMS LONGITUDINAL SECTION SHEET NO. DATE EFFECTIVE: 04/01/1983 (EXTENSION) 604.29C 2 OF 2 DATE PREPARED: 2/9/2018



### BASE PLAN



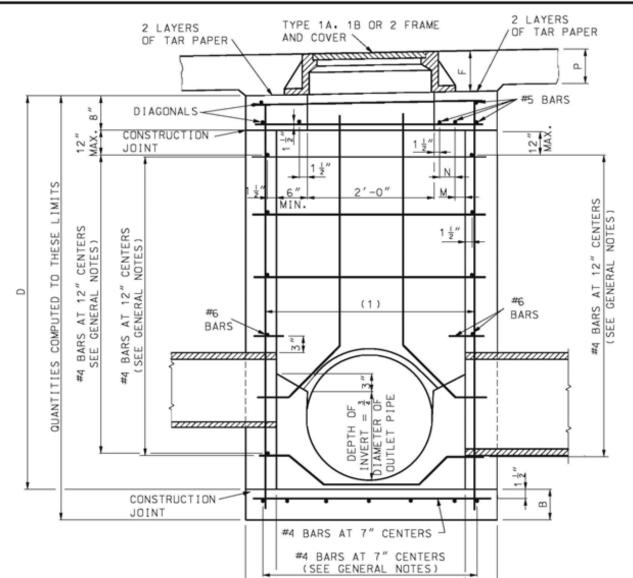
PLAN VIEW



STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'-0". STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE SET LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.



SECTION A-A

#### VARIABLE DIMENSIONS SIZE OF PIPE N ≤ 24" 3'-0" 4'-2" 7" 2 ½" 3'-6" 4'-8" 7" 5 1/2" 30" 4'-0" 5'-2" 7" VARIABLE 8 " 36" 42" 4'-6" 5'-8" 5 1 "\* 7"\* 5'-0" 6'-2" \* 4-#5 BARS ADDED

MINIMUM "D "SHALL BE THE OUTSIDE DIAMETER OF LARGEST PIPE ENTERING MANHOLE PLUS 16" CARRIED TO THE NEAREST 3".

HORIZONTAL AND VERTICAL BARS HORIZONTAL AND VERTICAL BARS AROUND PIPES.

MANHOLE FRAME AND COVER IN PAVED AREAS USE TYPE 1. IN UNPAVED AREAS USED TYPE 1A OR 1B. NO CHANGE IN QUANTITIES REQUIRED FOR FRAME AND COVER DETAILS. SEE OTHER DRAWINGS.

(1) 4-#4 FOR 3'-0" OPENING 5-#4 FOR 3'-6" & 4'-0" 6-#4 FOR 4'-6" & 5'-0"

GENERAL NOTES:

THE MAXIMUM DEPTH OF MANHOLE USING #4 HORIZONTAL BARS AT 12" CENTERS IS 20'.

OVER 20' DEPTH, HORIZONTAL BARS SHALL BE INCREASED TO A #5 BAR AT 10" CENTERS TO A MAXIMUM DEPTH OF 30'

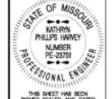
OVER 30' DEPTH WILL REQUIRE A SPECIAL DESIGN.

BOTTOM STEEL AT MORE THAN 20' DEPTH TO A MAXIMUM DEPTH OF 30' IS INCREASED TO #6 BARS AT 7" CENTERS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY: MO 65102 1-888-ASK-MODOT (1-888-275-6636)



CONCRETE MANHOLES

DATE EFFECTIVE: 02-01-2009 DATE PREPARED: 8/26/2009

604.30G

FOR PIPE OPENINGS											
		PIPE SIZES									
	12"	15"	18"	24"	30"	36"	42"	48"			
CUBIC YARDS CONCRETE TO DEDUCT	0.03	0.04	0.06	0.11	0.16	0.23	0.31	0.40			
ADDITIONAL S	TEEL RE	EQUIRED	FOR PIP	E OPENII	NG						
WIDTH OF WALL REQUIRED FOR PIPE 3'-0" 3'-6" 4'-0" 4'-6" 5'-0											
LENGTH OF #6 BAR REQUIRED 4'-0" 4'-6" 5'-0" 5'-6" 6'-0"											
WEIGHT OF BA	R LBS.			6.0	6.8	7.5	8.3	9.0			

#### NOTE:

CONCRETE QUANTITIES IN TABLE INCLUDE INVERT. THE QUANTITY OF STEEL FOR 3" OF "D" IS NOT  $\frac{1}{4}$  OF THAT FOR 1 FOOT OF "D", NEITHER IS THE QUANTITY FOR 6" OF "D" EQUAL TO 1 THAT FOR 1 FOOT OF "D". SO USE QUANTITY IN 1 FOOT COLUMN FOR FULL FEET AND IN 3" COLUMN FOR FRACTIONAL FEET.

				QUANT	ITIES			
		TO AN	D INCLU	) ING 20'	DEPTH	20' TO	AND INC	LUDING 30' DEPTH
SIZE (W)		D= 3'-3"	D= 4'-3"	SUBT	OR RACT EACH	ADD SUBT FOR		ADDITIONAL STEEL IN BOTTOM DIFFERENCE IN
				1 FT.	3 IN.	1 FT.	3 IN.	#4 AND #6 BARS
3'-0" X 3'-0"	С	1.62	1.93	0.31	0.08	0.31	0.08	
J -0 x J -0	S	157.90	176.80	18.60	2.00	20.64	5.16	30.14
3'-0" X 3'-6"	С	1.77	2.11	0.33	0.08	0.33	0.08	
3 -0 X 3 -6	S	173.80	194.60	20.60	2.30	23.12	5.78	34.85
3'-0" X 4'-0"	С	1.93	2.28	0.35	0.09	0.35	0.09	
3 -0 X 4 -0	S	187.10	208.60	21.30	2.30	24.27	6.07	39.56
3'-0" X 4'-6"	С	2.16	2.53	0.38	0.09	0.38	0.09	
3 -0 X 4 -6	S	211.20	234.70	23.30	2.70	26.75	6.69	44.26
3'-0" X 5'-0"	С	2.32	2.71	0.40	0.10	0.40	0.10	
	S	219.60	243.80	24.00	2.70	27.90	6.97	48.97
7/ 6// 1/ 7/ 6//	С	1.94	2.29	0.35	0.09	0.35	0.09	
3'-6" X 3'-6"	S	192.40	215.10	22.70	2.70	25.60	6.40	40.27
7/ 6// 1/ 0//	С	2.10	2.48	0.38	0.09	0.38	0.09	
3'-6" X 4'-0"	S	204.30	227.70	23.40	2.70	26.75	6.69	45.69
7/ 6// \	С	2.35	2.75	0.40	0.10	0.40	0.10	
3'-6" X 4'-6"	S	230.00	255.50	25.30	3.00	29.23	7.31	51.11
7/ 6" \ 5/ 6"	С	2.53	2.95	0.42	0.10	0.42	0.10	
3'-6" X 5'-0"	S	240.90	267.10	26.00	3.00	30.38	7.60	56.53
	С	2.28	2.68	0.40	0.10	0.40	0.10	
4'-0" X 4'-0"	S	216.70	240.80	24.10	2.70	27.90	6.97	51.83
4/ 0// 1/ 6//	С	2.55	2.97	0.42	0.10	0.42	0.10	
4'-0" X 4'-6"	S	246.40	272.60	26.00	3.00	30.38	7.60	57.96
4/ 0// 1/ 5/ 0//	С	2.74	3.18	0.44	0.11	0.44	0.11	
4'-0" X 5'-0"	S	255.60	282.50	26.70	3.00	31.53	7.88	64.10
4/ 6// 4/ 6//	С	2.75	3.19	0.44	0.11	0.44	0.11	
4'-6" X 4'-6"	S	276.80	304.90	28.00	3.30	32.86	8.22	64.81
4/ 6// 1/ 5/ 6//	С	2.94	3.41	0.46	0.12	0.46	0.12	
4'-6" X 5'-0"	S	289.40	318.20	28.70	3.30	34.01	8.50	71.66
= 1	С	3.15	3.64	0.48	0.12	0.48	0.12	
5'-0" X 5'-0"	S	299.80	329.30	29.40	3.30	35.16	8.79	79.23

TO AND INCLUDING 20-FOOT DEPTH

TO COMPUTE THE QUANTITIES FOR DEPTHS ("D") NOT SHOWN, REFER TO TABLE FOR THE SIZE OF MANHOLE REQUIRED. SUBTRACT THE "D" VALUE FROM THE TABLE AND THE "D" VALUE FROM THE PLANS. MULTIPLY THE VALUES SHOWN IN THE 1-FOOT COLUMN FROM THE TABLE WITH THE FULL ONE FOOT INCREMENTS FROM THE DIFFERENCE BETWEEN THE "D" FROM THE PLANS AND THE "D" FROM THE TABLE. MULTIPLY THE VALUES SHOWN IN THE 3" COLUMN FROM THE TABLE WITH THE REMAINING FRACTIONAL FOOT VALUES PER 3" INCREMENTS. FOLLOW THIS SAME PROCESS FOR THE STEEL CALCULATIONS. SEE THE EXPAMPLE BELOW:

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 6'-9" "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:

"D" REQUIRED = 6'-9"

"D" GIVEN IN TABLE = 4'-3" "D" ADDITIONAL = 2'-6"

2.76	CONCRETE	STEEL
FROM TABLE FOR 4'-3" "D"	2,28	208.6
ADD (2 X QUANTITIES FOR 1-FOOT)	0.70	42.6
ADD $(6" = 2 \times 3")$ $(2 \times QUANTITIES FOR 3")$	0.18	255.8
SUBTOTAL	3.16	255.8
ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT		
CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL)	-0.40	+19.5
TOTAL	2.76	275.3
USE	2.80	280.0

MORE THAN 20-FOOT TO AND INCLUDING 30-FOOT DEPTH

FIRST, COMPUTE QUANTITIES FOR 20-FOOT DEPTH FROM THE TABLE "TO AND INCLUDING 20-FOOT DEPTHS".

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 20'-0", "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:

"D" REQUIRED = 20' - 0''"D" GIVEN IN TABLE = 4'-3" "D" ADDITIONAL = 15' - 9''

	CONCRETE	STEEL
FROM TABLE FOR 4'-3" "D"	2.28	208.6
ADD (15 X QUANTITIES FOR 1-FOOT)	5.25	319.9
ADD $(9" = 3 \times 3")$ $(3 \times QUANTITIES FOR 3")$	0.27	6.9
SUBTOTAL	7.80	535.0
ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT		
CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL)	-0.40	+19.5
TOTAL	7.40	554.5

SECOND, COMPUTE QUANTITIES FOR THE DEPTHS BEYOND 20 FEET TO A MAXIMUM OF 30 FEET, USING THE TABLE "20-FOOT TO AND INCLUDING 30-FOOT DEPTH", AND ADD TO THE QUANTITIES FOR 20-FOOT DEPTH. ALSO, ADD THE DIFFERENCE IN STEEL IN THE BOTTOM DUE TO THE INCREASE IN SIZE OF BARS FROM #4 TO #6 BARS ON 7-INCH CENTERS.

FOR EXAMPLE:

= 30'-0" "D" REQUIRED
"D" COMPUTED = 20' - 0''

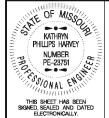
"D" ADDITIONAL = 10' -0''

	CONCRETE	STEEL
ADD CONCRETE (10 X QUANTITIES FOR 1-FOOT)	3.50	
ADD STEEL (10 X QUANTITIES FOR 1-FOOT)	242.70	
ADD STEEL (ADDITIONAL STEEL IN BOTTOM)		39,56
TOTAL (30-FOOT DEPTH)	10.90	836.76
USE	10.9	840.0



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

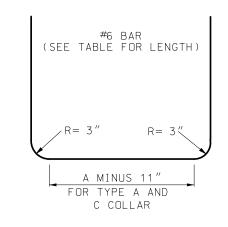
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE MANHOLES

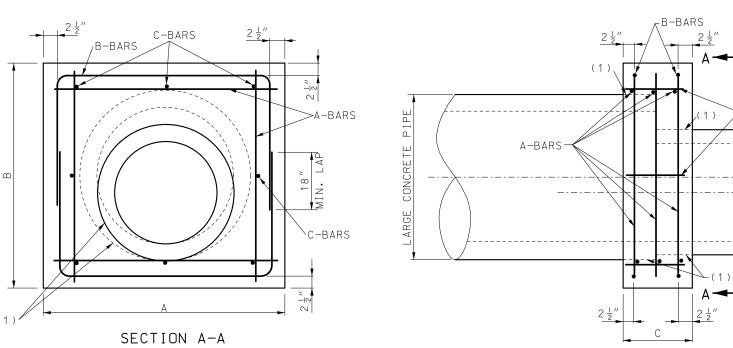
DATE EFFECTIVE: 02-01-2009 DATE PREPARED:

604.30G



#### BENDING DIAGRAM FOR B-BARS

(1) ONE LAYER COMMERCIALLY AVAILABLE 55-POUND ROLL ROOFING.



ELEVATION (FOR PIPES OF DISSIMILAR SIZE OR MATERIAL)

-C-BARS

FLOW LINE

TYPE A COLLAR

	TABLE OF DIMENSIONS											
	ZE PIPE	DIMEN	SIONS	LE	NGTH OF BAF	 RS	QUANTI					
LARGE (IN.)	SMALL (IN.)	A & B (FTIN.)	(FTIN.)	A(#5) 12 REQUIRED (FTIN.)	B(#6) 4 REQUIRED (FTIN.)	C(#4) 8 REQUIRED (FTIN.)	CONCRETE (CU. YD.)	STEEL (LBS.)				
12	12	2-8	1-0	2-5	5-10	0-9	0.21	70				
15	12 15	3-0	1-0	2-9	6-6	0-9	0.27 0.25	77				
18	12 15 18	3-3	1-0	3-0	7-0	0-9	0.33 0.32 0.30	84				
21	12 15 18	3-6	1-0	3-3	7-6	0-9	0.36 0.34 0.33	90				
24	15 18 24	3-10	1-0	3-6	8-2	0-9	0.44 0.40 0.36	97				
30	18 24 30	4-5	1-4	4-2	9-4	1-0	0.71 0.66 0.60	114				
36	24 30 36	5-0	1-4	4-9	10-6	1-0	0.88 0.79 0.76	128				
42	30 36 42	5-7	1-4	5-4	11-8	1-0	1.05 0.98 0.89	142				
48	36 42 48	6-2	1-4	6-0	12-10	1-0	1.22 1.13 1.03	158				
54	42 48 54	7-1	1-8	6-9	14-8	1-6	2.02 1.90 1.76	181				
60	48 54 60	7-8	1-8	7-5	15-10	1-6	2.27 2.13 1.97	196				
66	54 60 66	8-3	2-0	8-0	17-0	1-9	3.04 2.85 2.65	210				
72	60 66 72	8-10	2-0	7-7	18-2	1-9	3.36 3.16 2.93	225				

#### GENERAL NOTES:

FOR PIPE EXTENSIONS THAT ARE 5 FEET IN LENGTH OR SHORTER, A SMOOTH TAPERED SLEEVE MAY BE USED IN LIEU OF A TYPE A COLLAR, IF APPROVED BY THE ENGINEER. SEE SMOOTH TAPERED SLEEVE DETAIL IN STANDARD PLAN 732.00.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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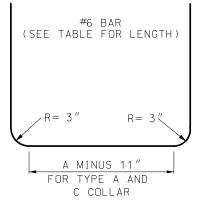


# PIPE COLLARS TYPE A

DATE PREPARED: 4/29/2021

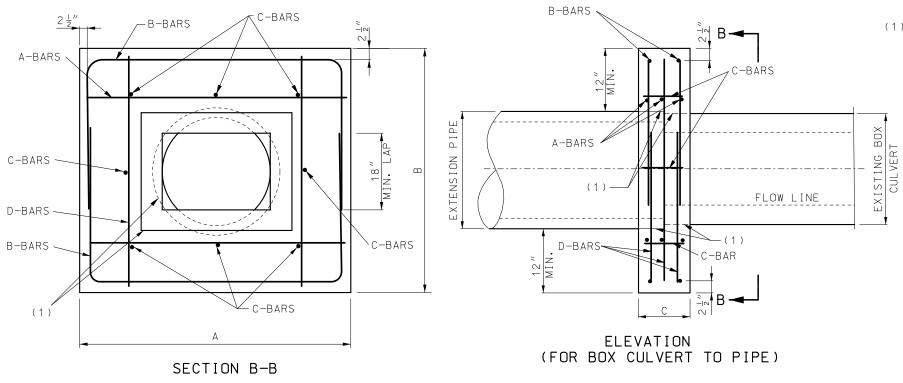
DATE EFFECTIVE: 07/01/2021

604.40G



BENDING	DIAGRAM	FOR	B-BARS

	TABLE OF DIMENSIONS									
BOX	PIPE	D	IMENSIONS			LENGTH OF BARS				
SIZE (FT.)	SIZE (IN.)	A (FTIN.)	B (FTIN.)	C (FTIN.)	A(#5) 6 REQUIRED (FTIN.)	B(#6) 4 REQUIRED (FTIN.)	C(#4) 8 REQUIRED (FTIN.)	D(#5) 6 REQUIRED (FTIN.)	CONCRETE (CU.YD.)	STEEL (LBS.)
$2 \times 1\frac{1}{2}$	24	5-1	4-9	1-0	4-10	10-4	0-9	4-6	0.65	124
2 × 2	30	5-3	5-3	1-4	5-0	11-0	1-0	5-0	0.93	134
3 × 2	36	6-1	5-10	1-4	5-10	12-5	1-0	5-7	1.16	151
3 × 3	42	6-5	6-5	1-4	6-0	13-4	1-0	6-0	1.29	162



TYPE C COLLAR

(1) ONE LAYER COMMERCIALLY AVAILABLE 55-POUND ROLL ROOFING.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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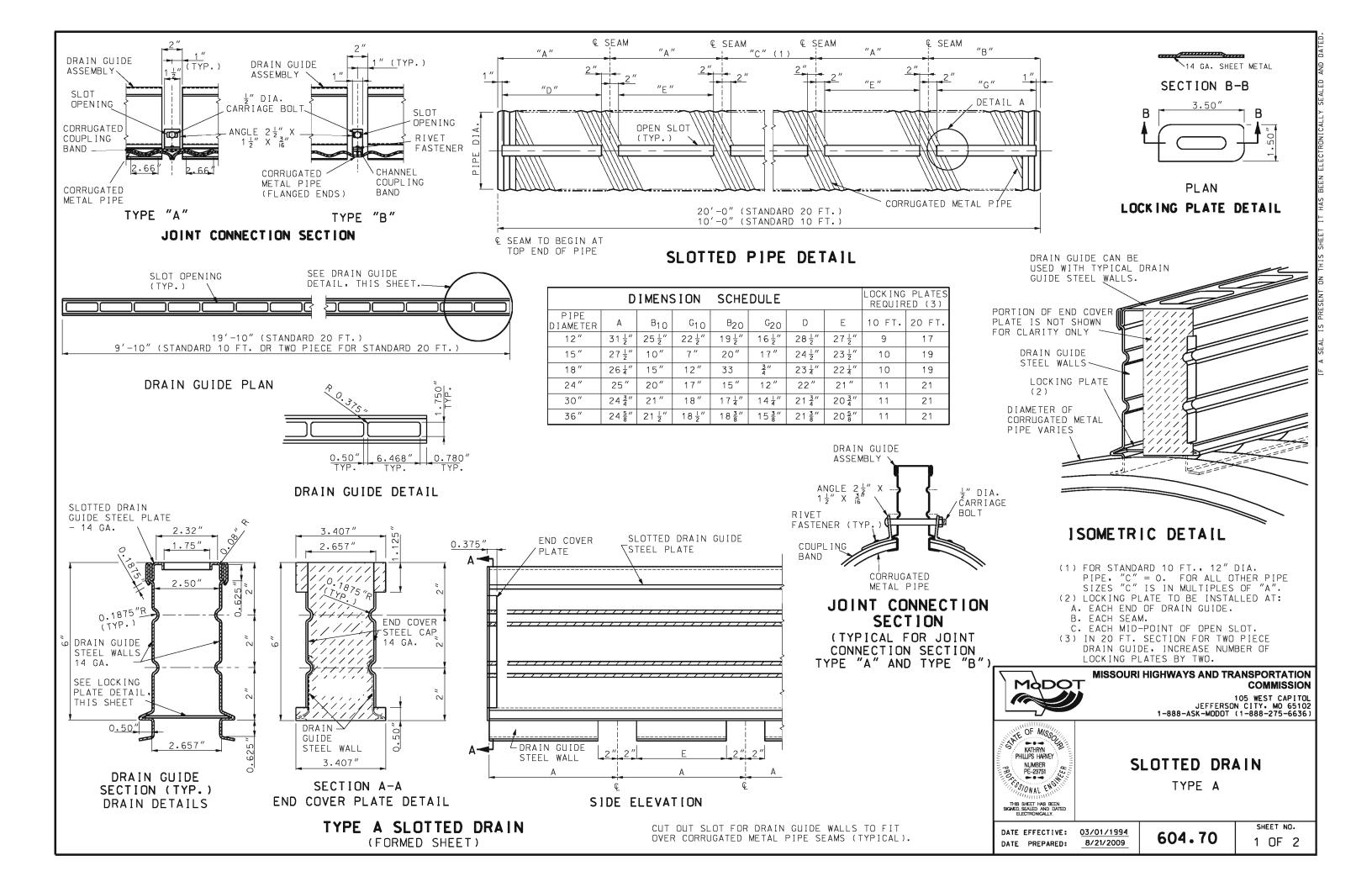


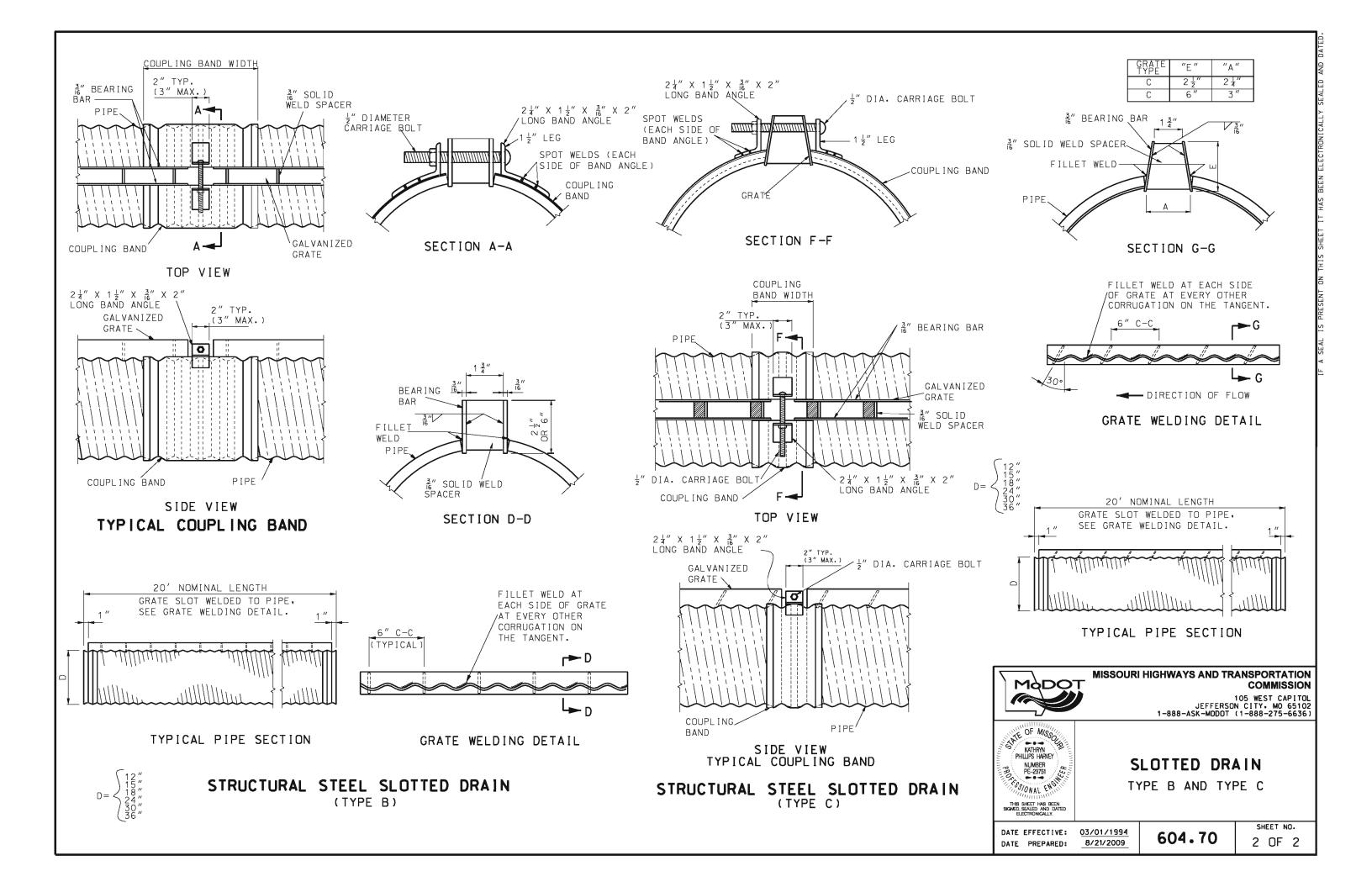
PIPE COLLARS TYPE C

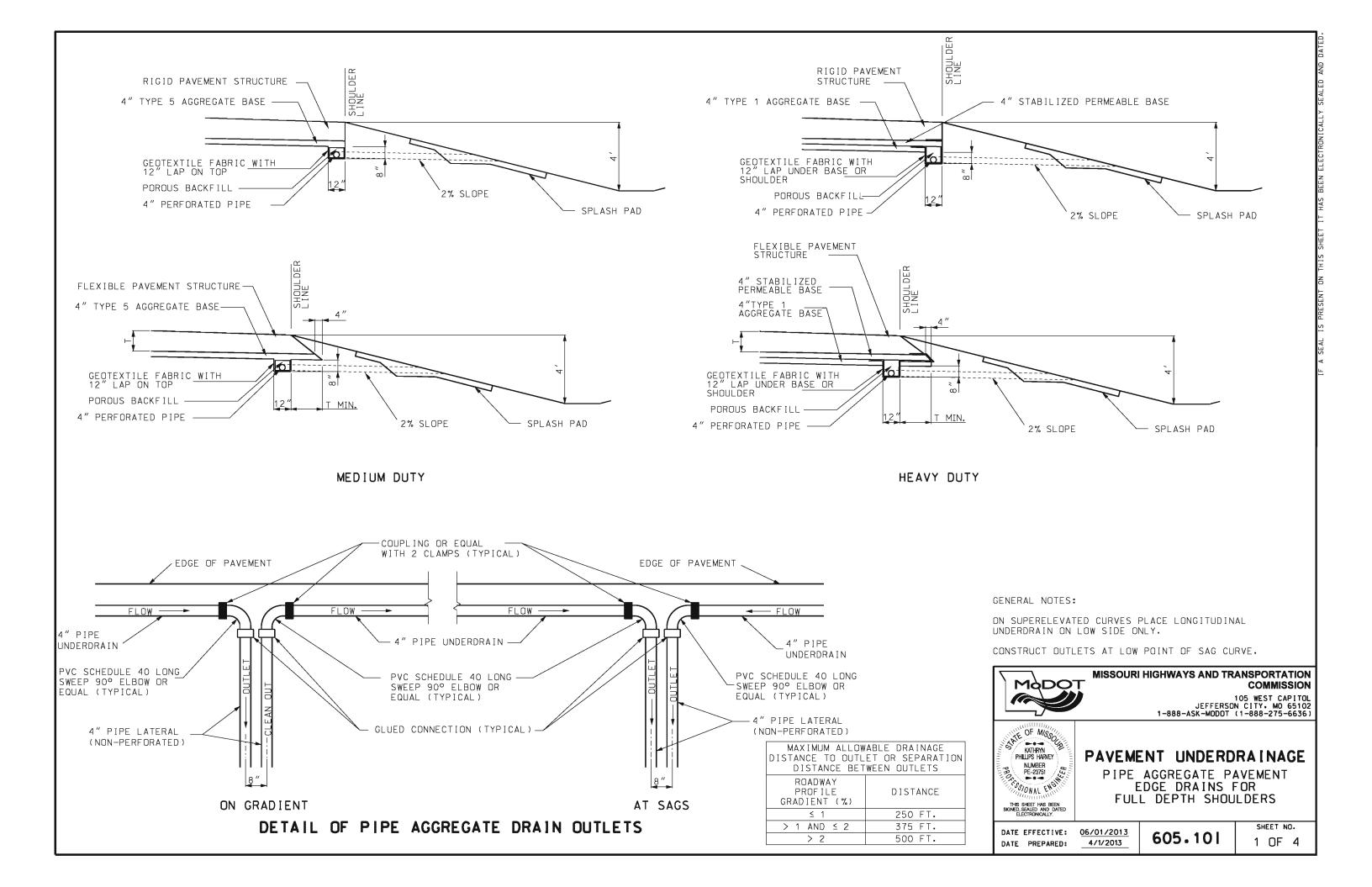
DATE PREPARED: 4/29/2021

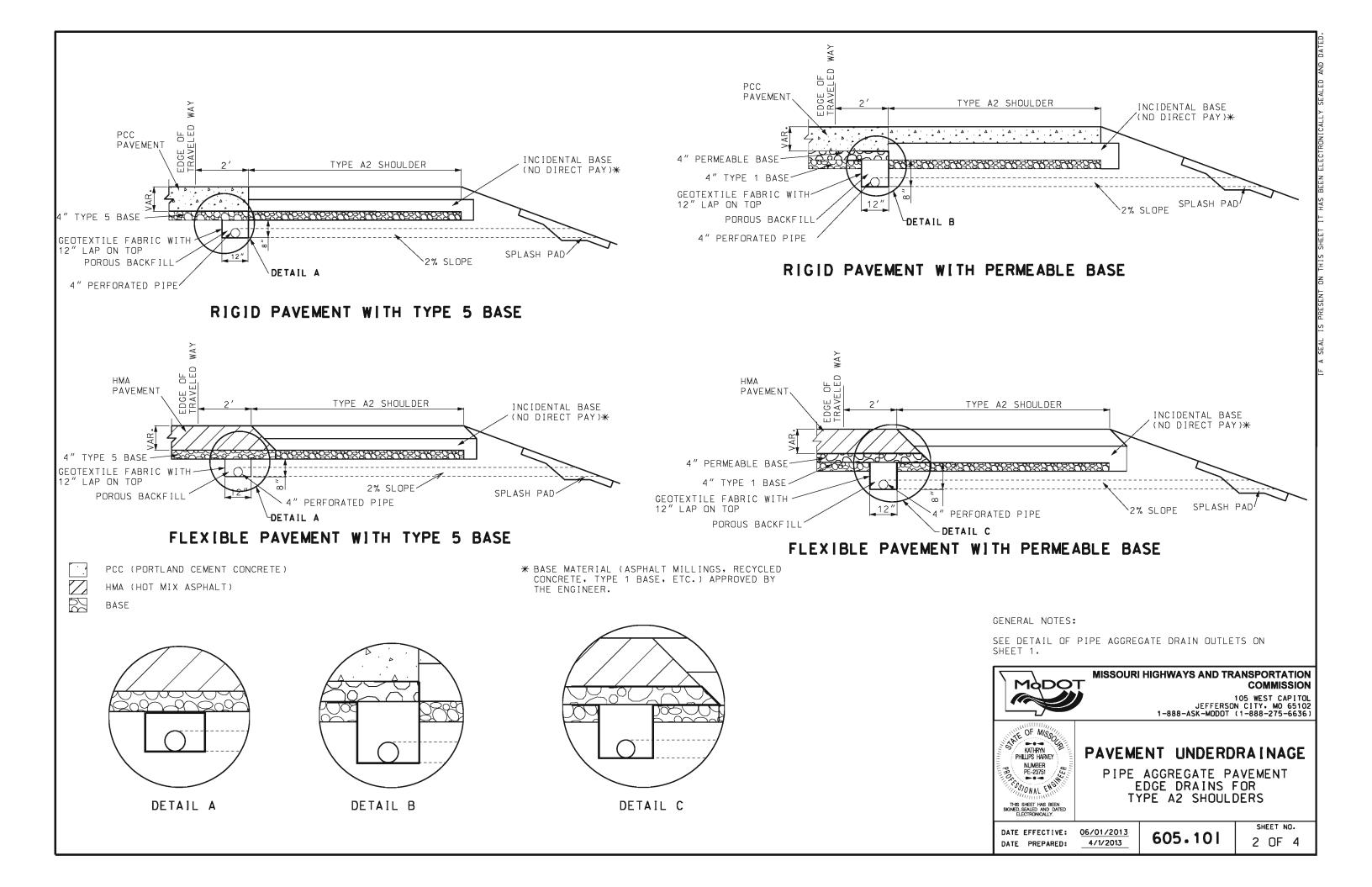
DATE EFFECTIVE: 07/01/2021

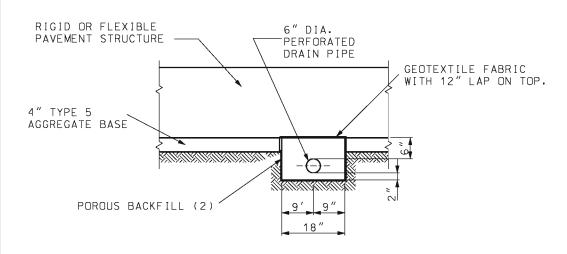
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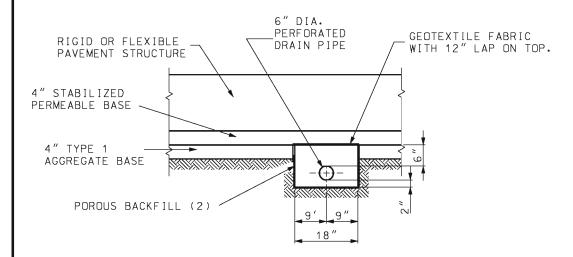




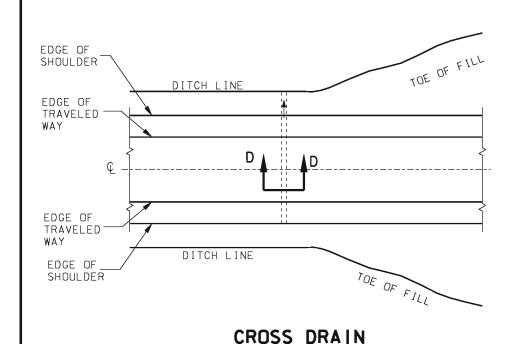


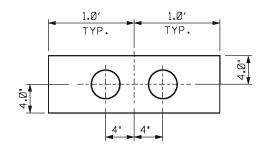


### SECTION D-D WITHOUT PERMEABLE BASE

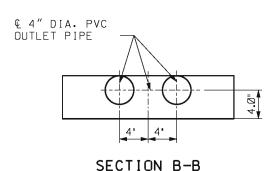


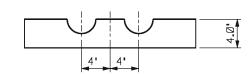
SECTION D-D WITH PERMEABLE BASE



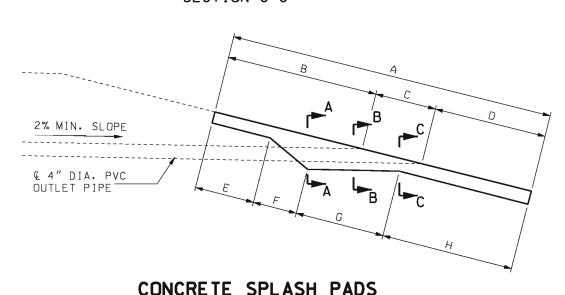


SECTION A-A





SECTION C-C



ITEM	2:1	3:1	4:1	6:1
Α	5.48′	6.19′	6.95′	8.58′
В	2.70′	3.07′	3.46′	4.28′
С	0.78′	1.12′	1.49′	2.30'
D	2.00'	2.00'	2.00′	2.00'
Е	2.00′	2.00′	2.00′	2.00'
F	0.46′	0.61′	0.78′	1.18′
G	0.71′	1.07′	1.46′	2.27′
Н	2.31'	2.51′	2.71′	3.13'
CONC.	0.15 C.Y.	0.17 C.Y.	0.20 C.Y.	0.25 C.Y.

GENERAL NOTES:

PRECAST CONCRETE SPLASH PADS MAY BE INSTALLED AS APPROVED BY THE ENGINEER.

TOP OF SPLASH PAD SHALL MATCH EXISTING CROSS SLOPE. CONSTRUCT BEND IN SPLASH PAD WHERE CROSS SLOPE CHANGES.

DIMENSIONS ARE APPROXIMATE AND CAN BE ADJUSTED AS DIRECTED BY THE ENGINEER.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

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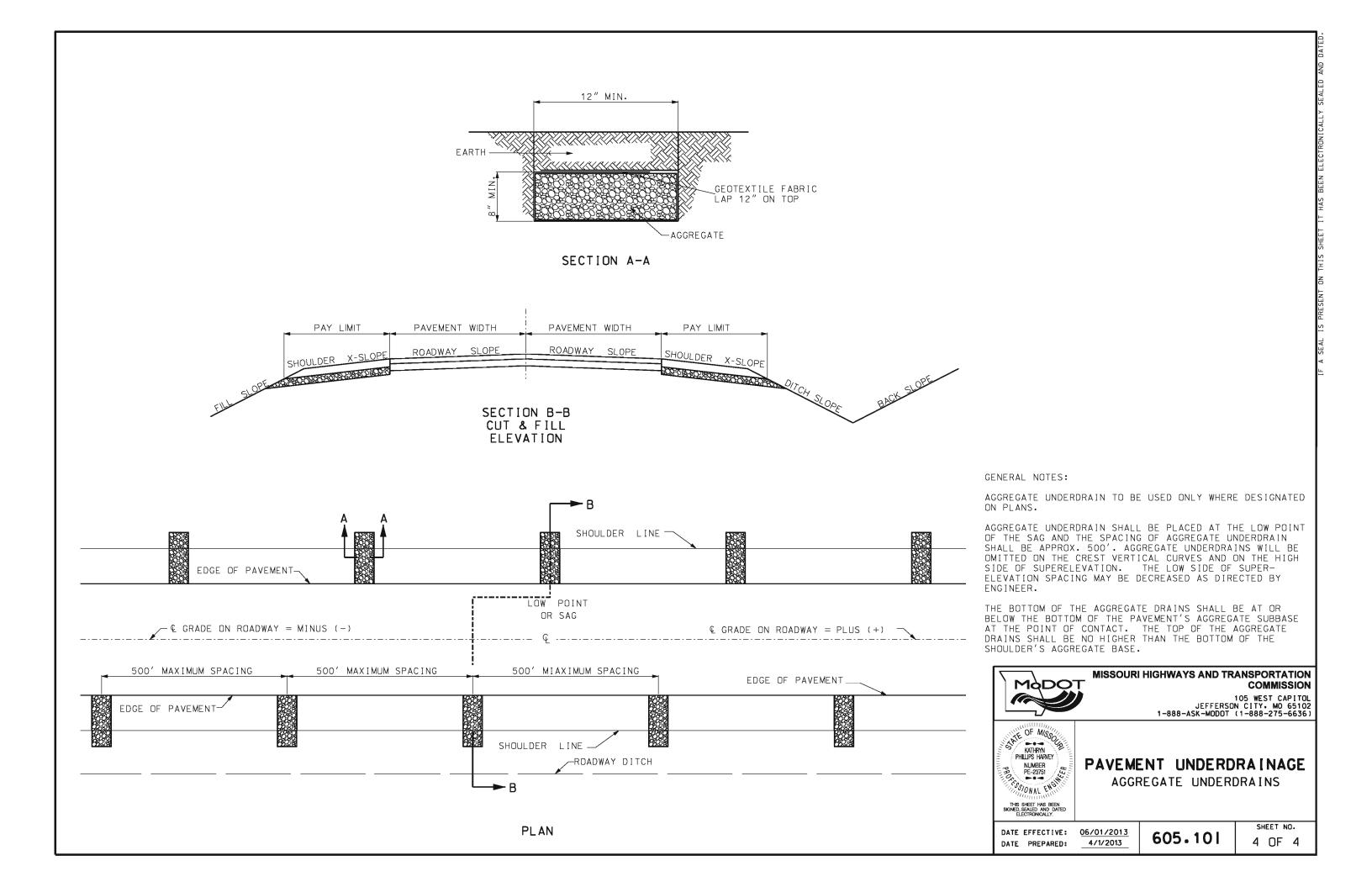
## PAVEMENT UNDERDRA[NAGE CROSS DRAINS

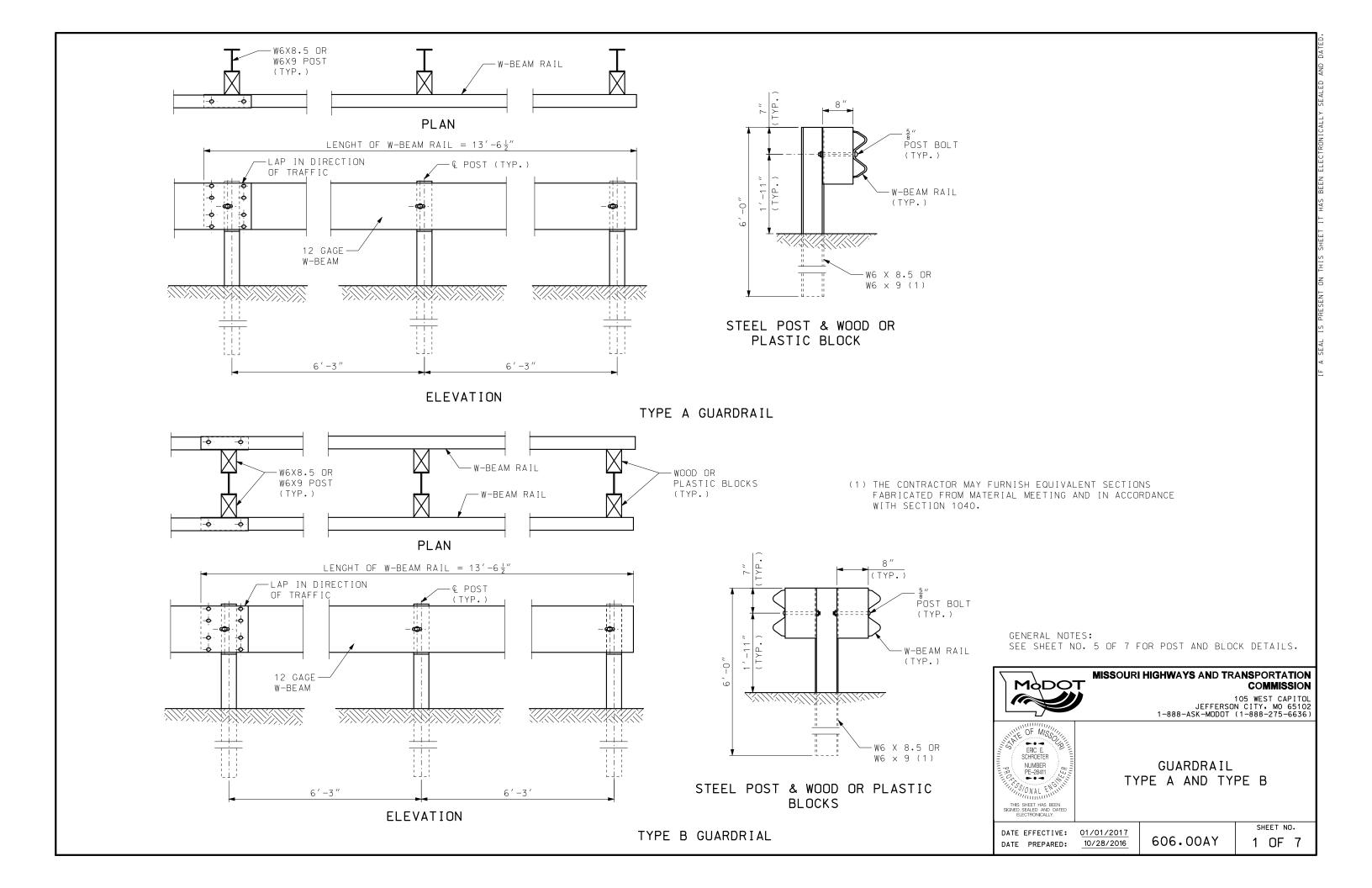
605.101

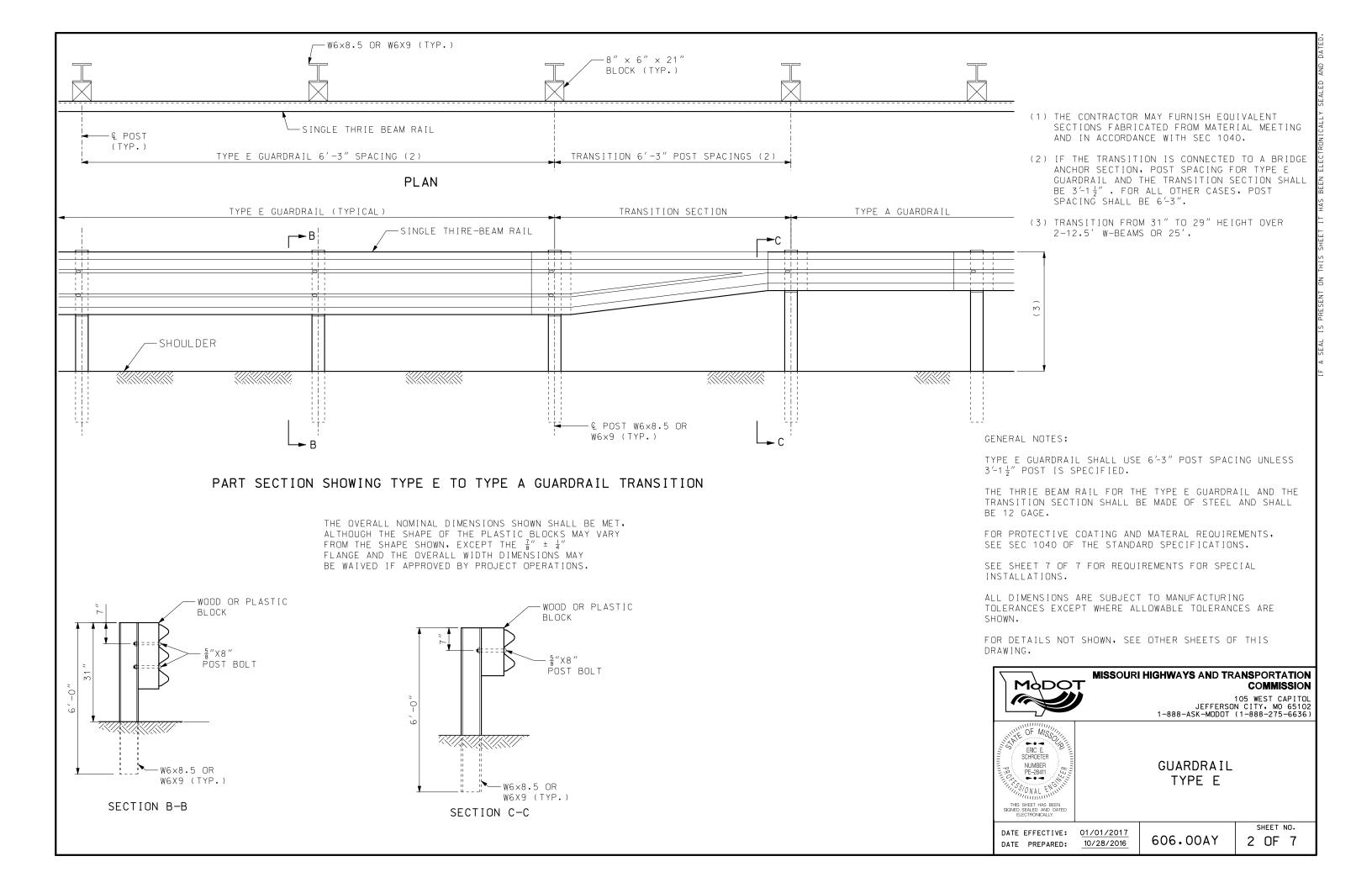
SHEET NO.

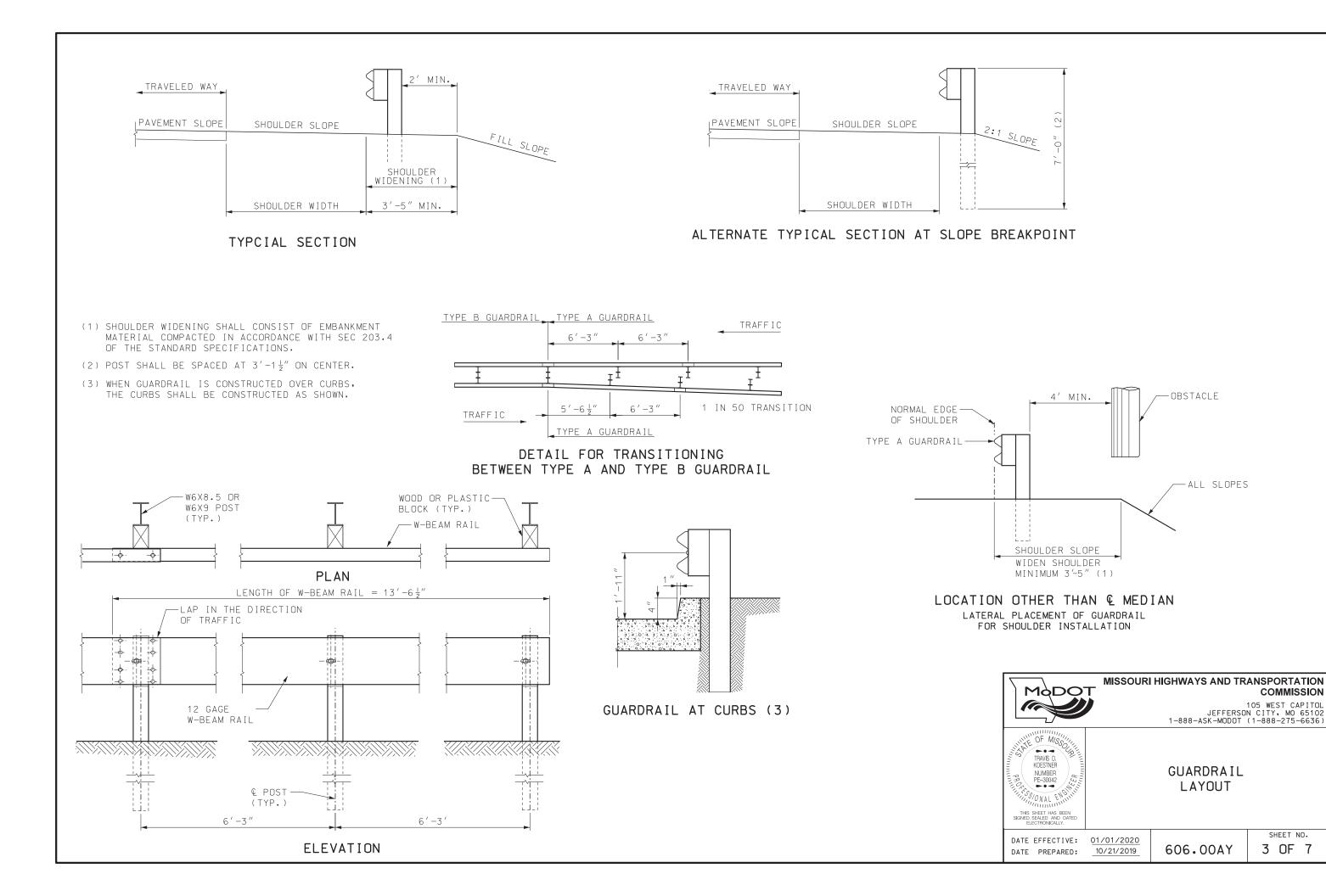
DATE EFFECTIVE: 06/01/2013 DATE PREPARED:

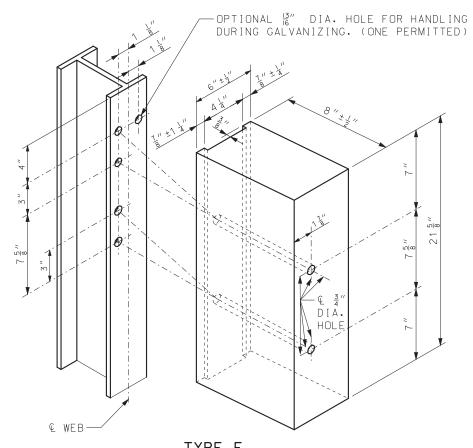
3 OF 4

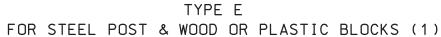


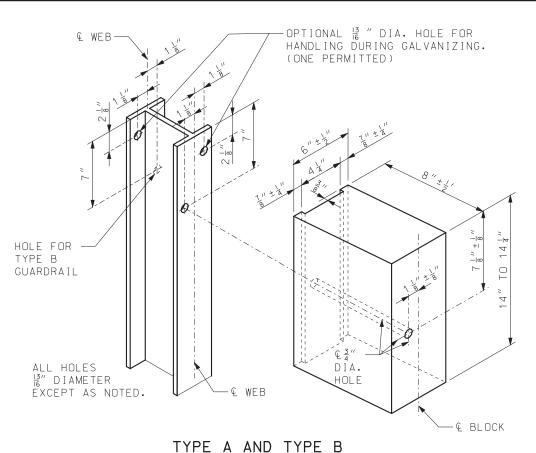






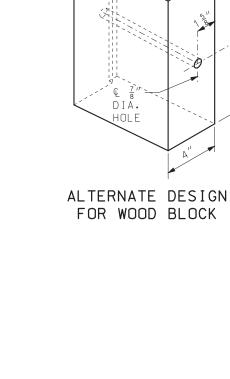


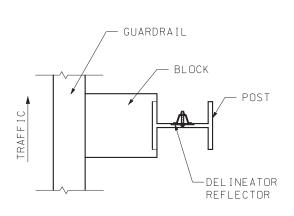


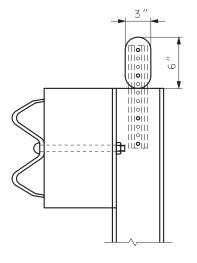


FOR STEEL POST AND WOOD OR PLASTIC BLOCKS (1)

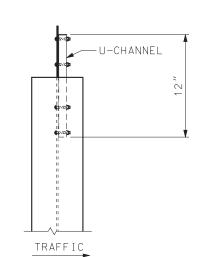
(1) THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE  $\frac{7}{8}$ "  $\pm \frac{1}{4}$ " FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.







DELINEATORS ON NEW GUARDRAIL



GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE STD PLAN 903.03.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

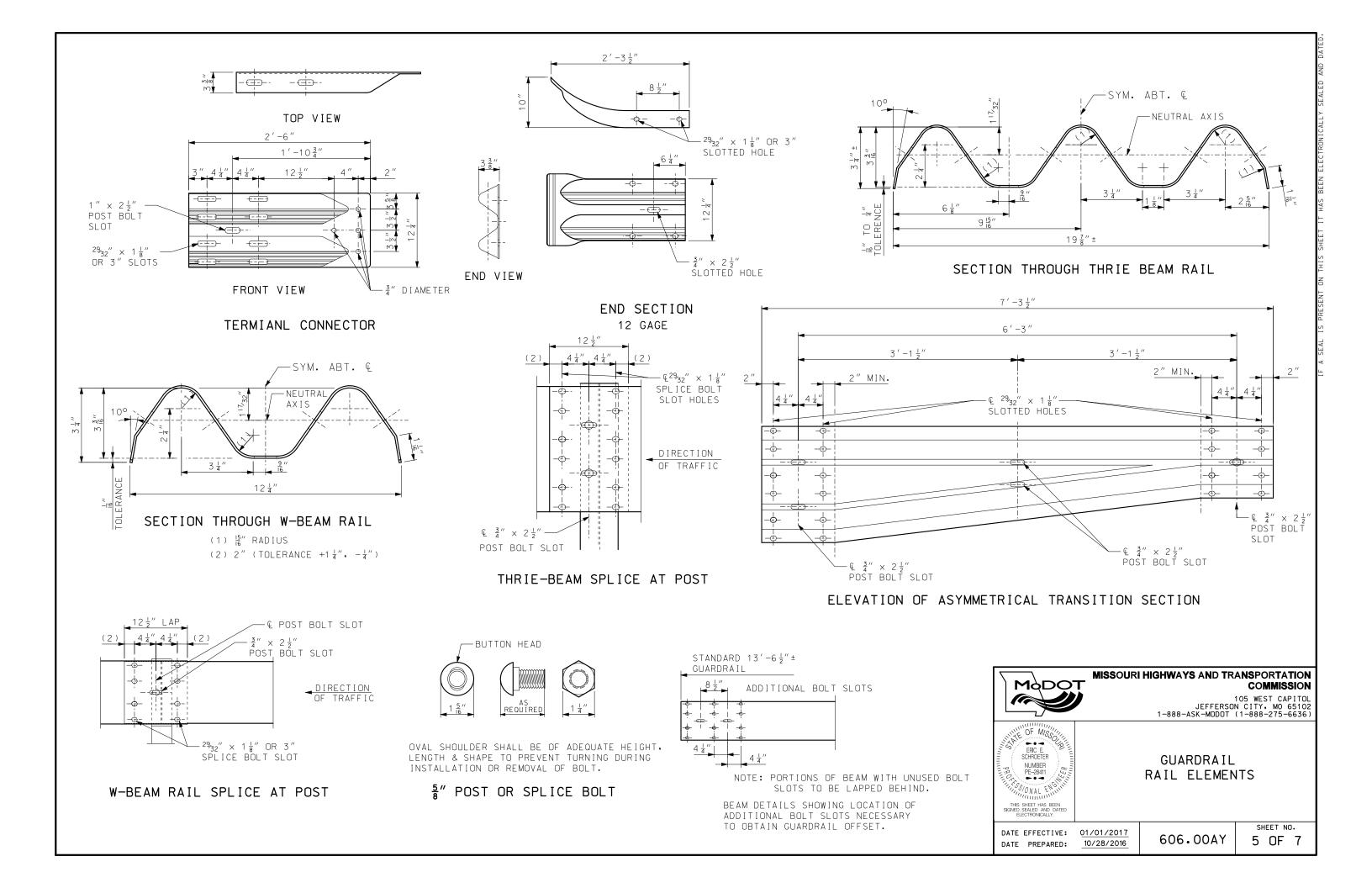
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

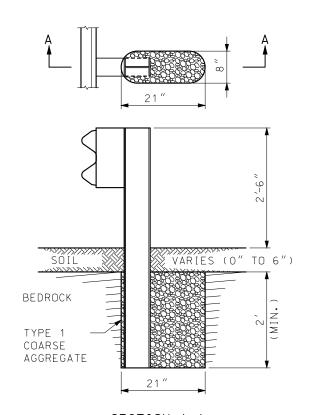
GUARDRAIL POST AND BLOCK

DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018

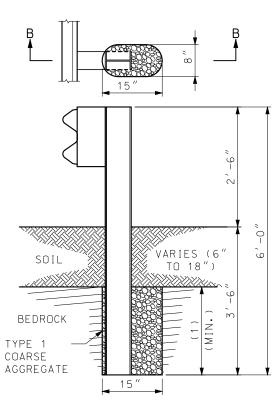
606.00AY

SHEET NO. 4 OF 7



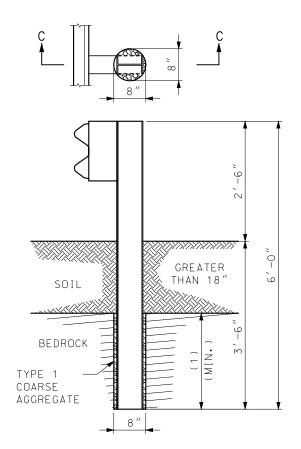


SECTION A-A
ROCK ENCOUNTERED
UP TO 6" BENEATH SURFACE



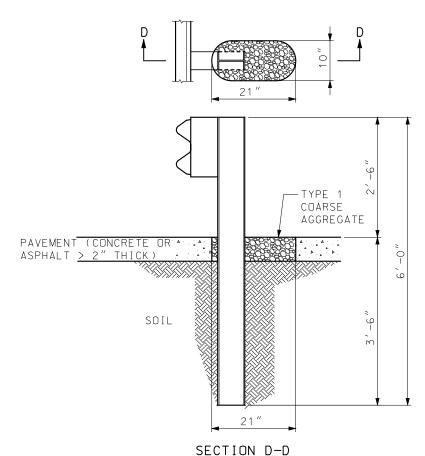
SECTION B-B
ROCK ENCOUNTERED
6" TO 18" BENEATH SURFACE

SETTING POST IN SOLID ROCK



SECTION C-C ROCK ENCOUNTERED MORE THAN 18" BENEATH SURFACE

(1)MINIMUM ROCK EMBEDMENT IS EQUAL TO FULL DEPTH POST EMBEDMENT MINUS SOIL DEPTH.

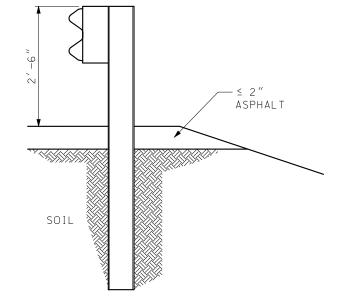


SETTING POST THROUGH PAVEMENT (CONCRETE OR ASPHALT > 2" THICK)

GENERAL NOTES:

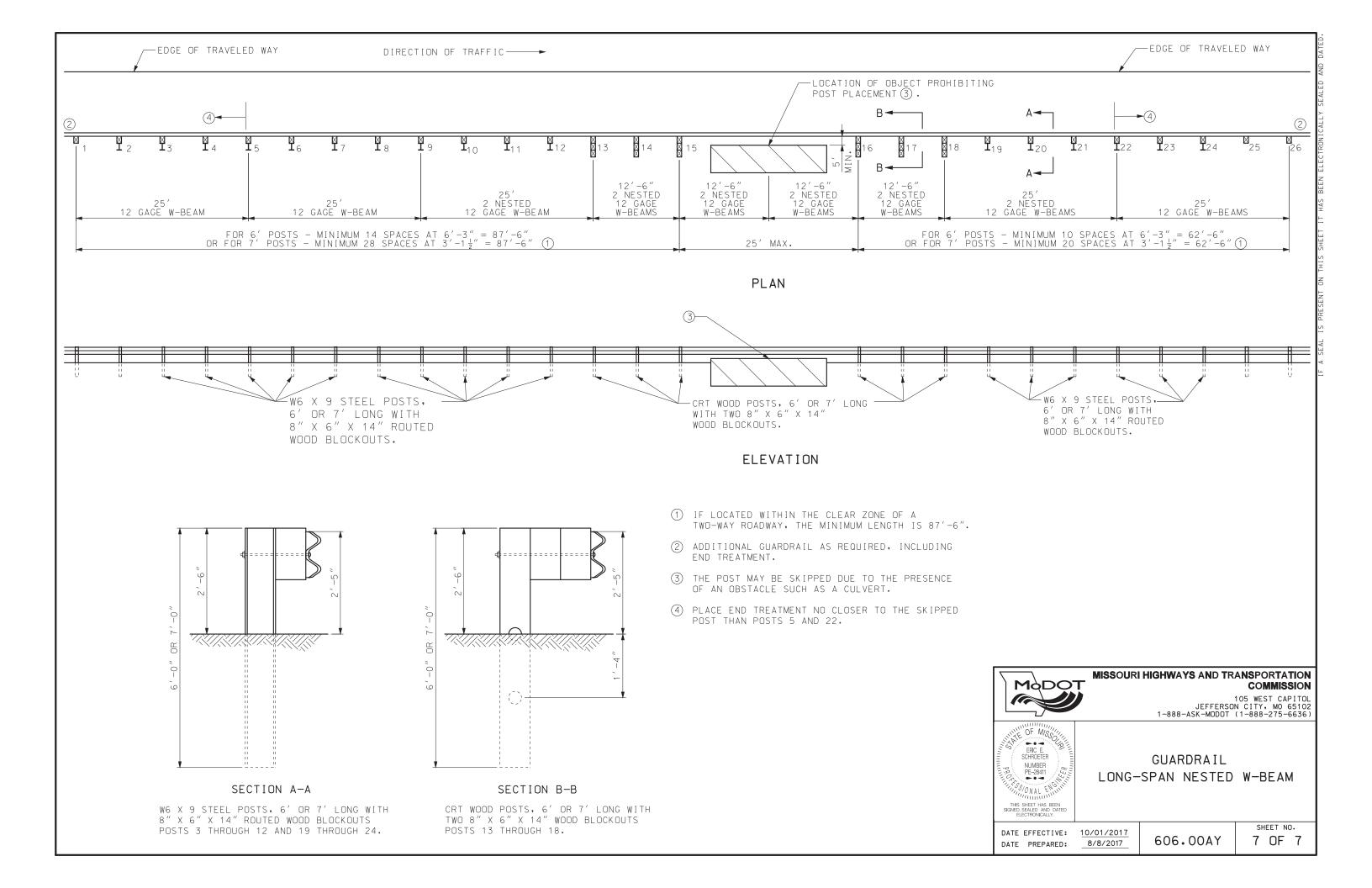
HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

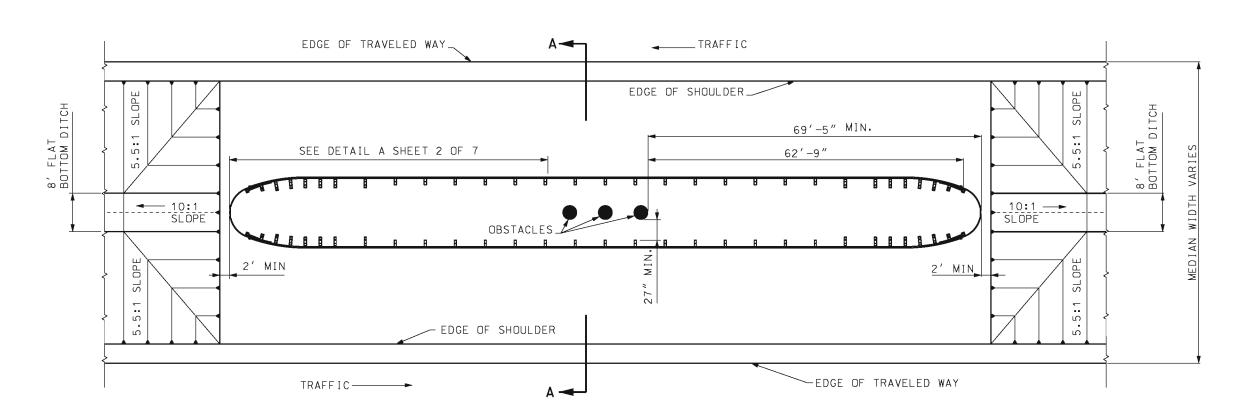
POST MAY BE SHORTER WHERE PLACED IN A MINIMUM 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF THE STANDARD SPECIFICATIONS.



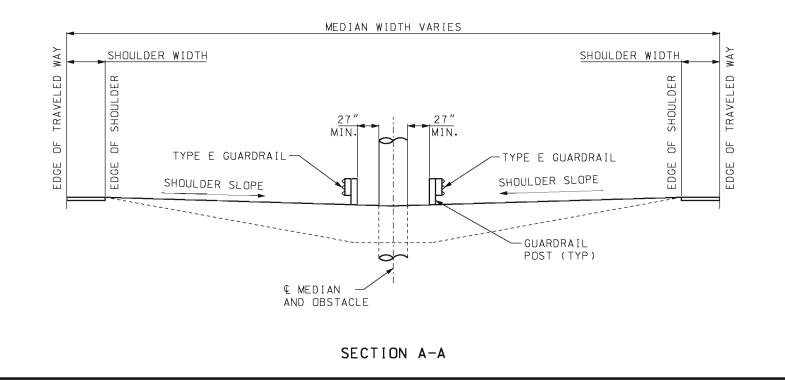
SETTING POST THROUGH ASPHALT ≤ 2" THICK







PIER AT & OF MEDIAN PLAN VIEW

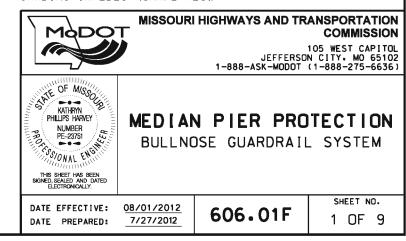


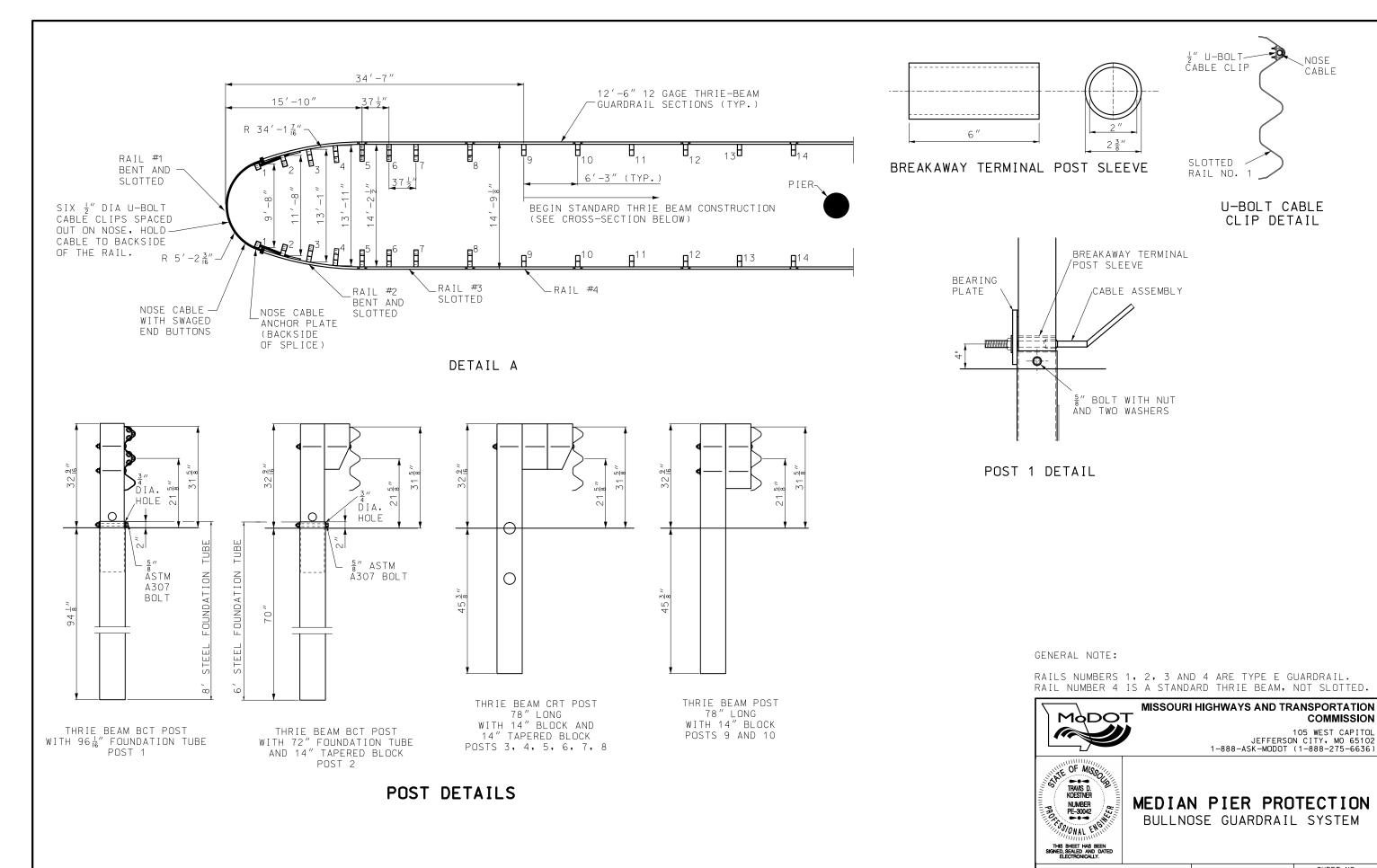
GENERAL NOTES:

WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL.

THE BULLNOSE GUARDRAIL PAY ITEM INCLUDES THE STRUCTURE BETWEEN POST 10 AND THE NOSE, THE REMAINING GUARDRAIL WILL BE PAID FOR AS STANDARD GUARDRAIL ITEMS.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.





SHEET NO. 606.01F 2 OF 9

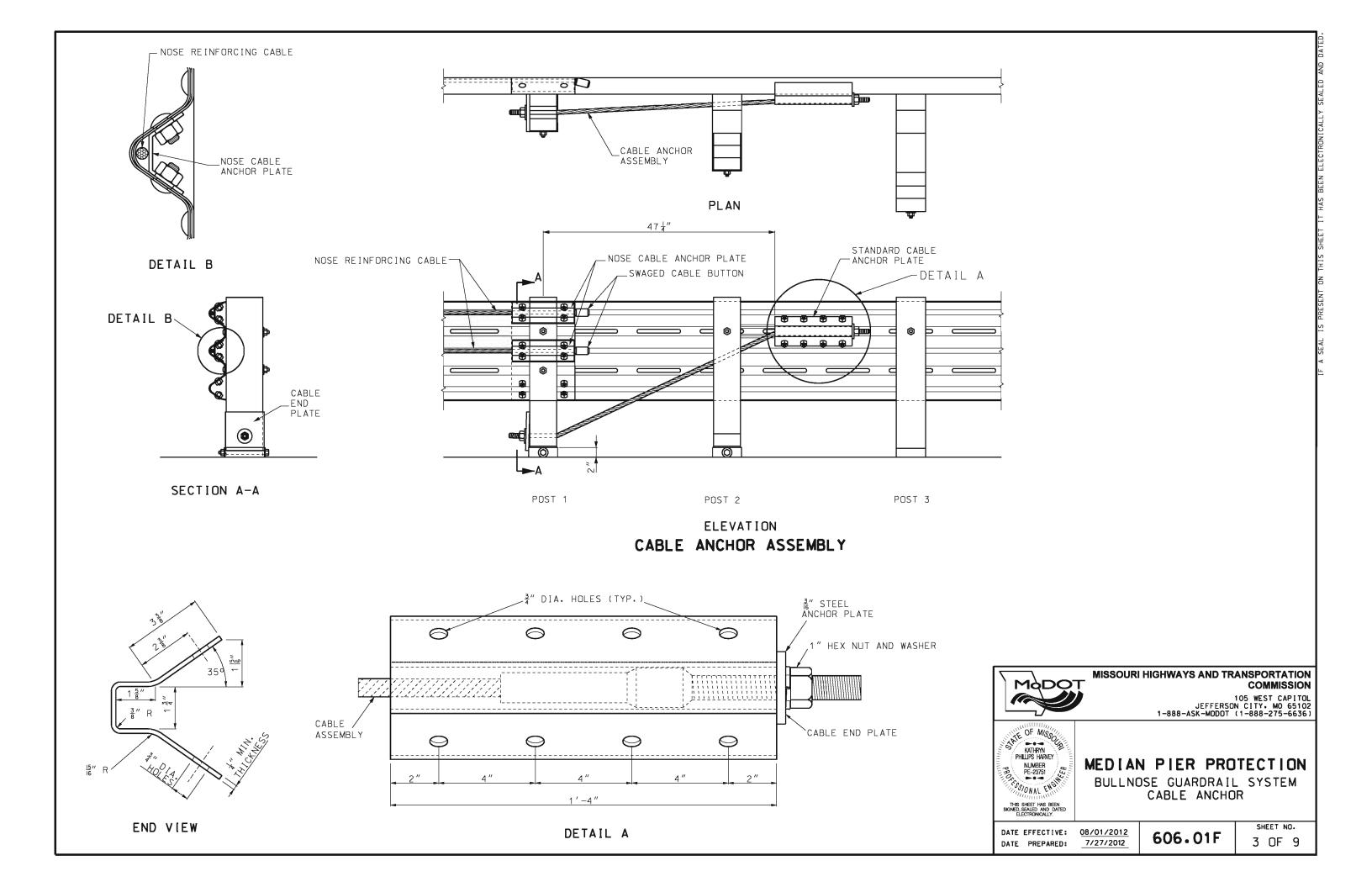
DATE EFFECTIVE: 04/01/2021

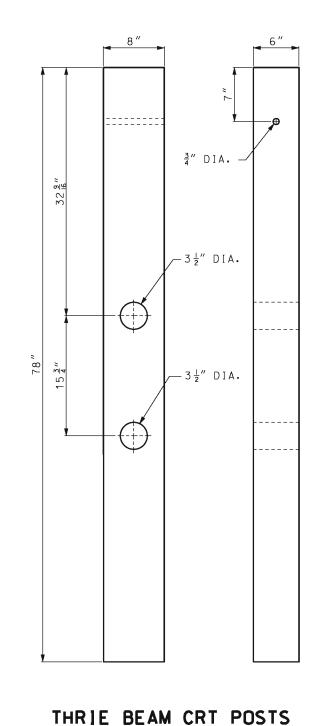
DATE PREPARED: 1/27/2021

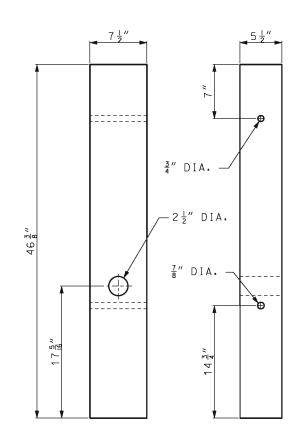
COMMISSION

NOSE

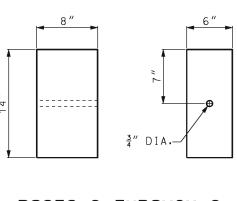
CABLE



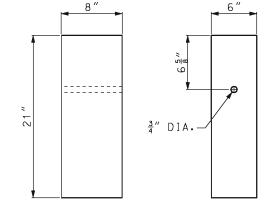




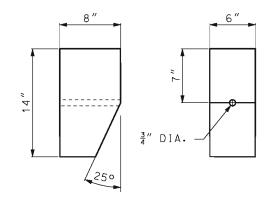
THRIE BEAM ANCHOR POSTS



POSTS 2 THROUGH 8 STANDARD BLOCKS



BLOCKS FOR POSTS 9 AND 10 STANDARD BLOCKS

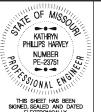


TAPERED BLOCK



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# MEDIAN PIER PROTECTION

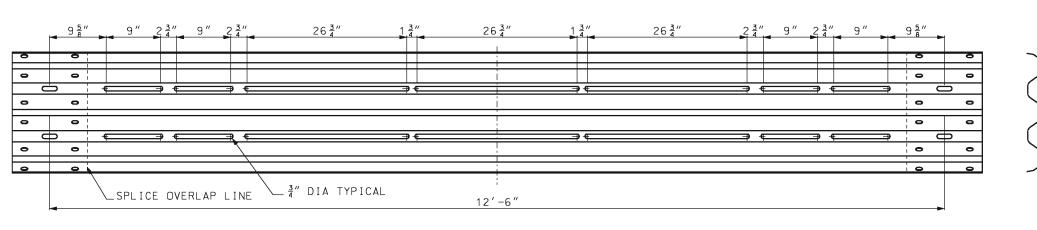
BULLNOSE GUARDRAIL SYSTEM POST AND BLOCKS

DATE EFFECTIVE: 08/01/2012 DATE PREPARED:

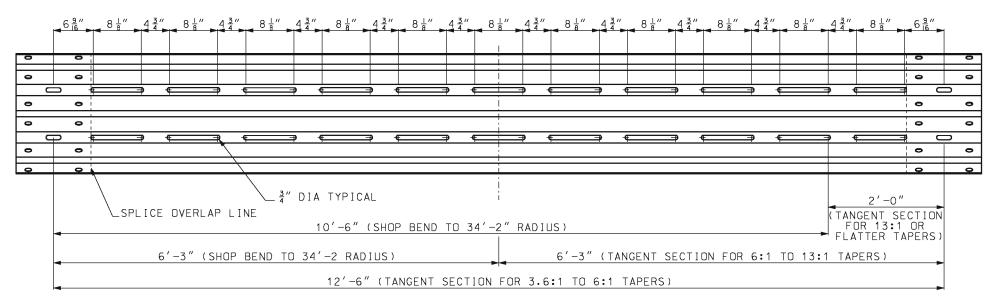
7/27/2012

606.01F

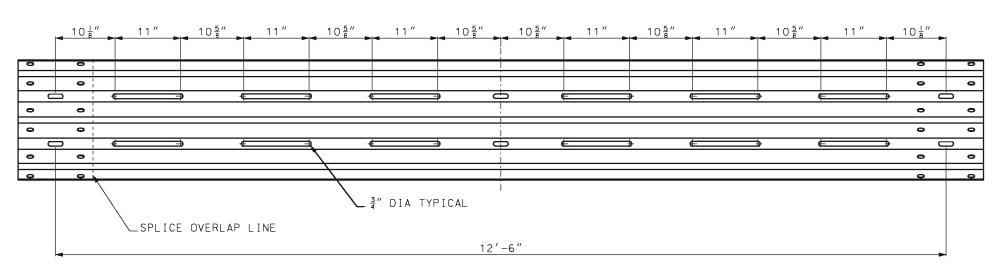
SHEET NO. 4 OF 9



## RAIL SECTION 1 (NOSE SECTION)



### RAIL SECTION 2



# RAIL SECTION 3



### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODDT (1-888-275-6636)



## MEDIAN PIER PROTECTION

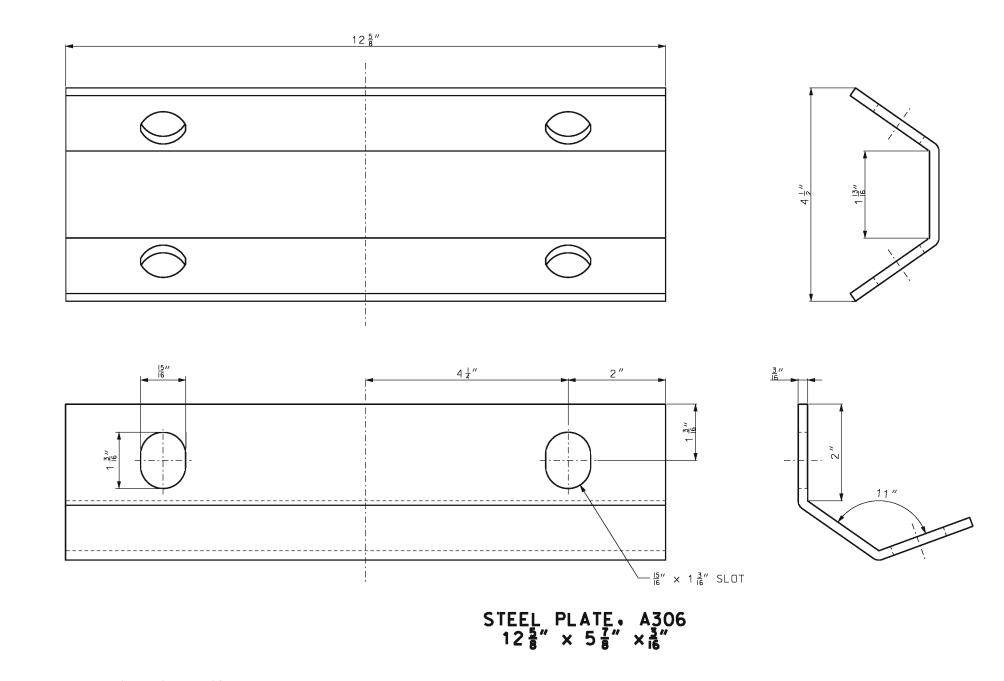
BULLNOSE GUARDRAIL SYSTEM RAIL SECTION 1. 2 AND 3

DATE EFFECTIVE: 08/01/2012 DATE PREPARED:

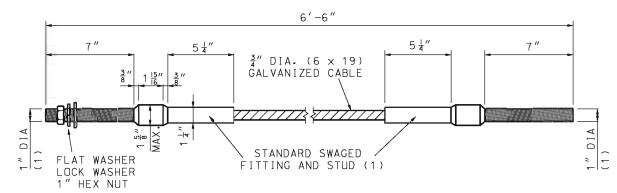
7/27/2012

606.01F

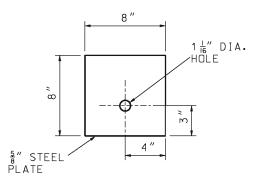
SHEET NO. 5 OF 9







DETAIL OF CABLE ASSEMBLY



DETAIL OF STEEL BEARING PLATE



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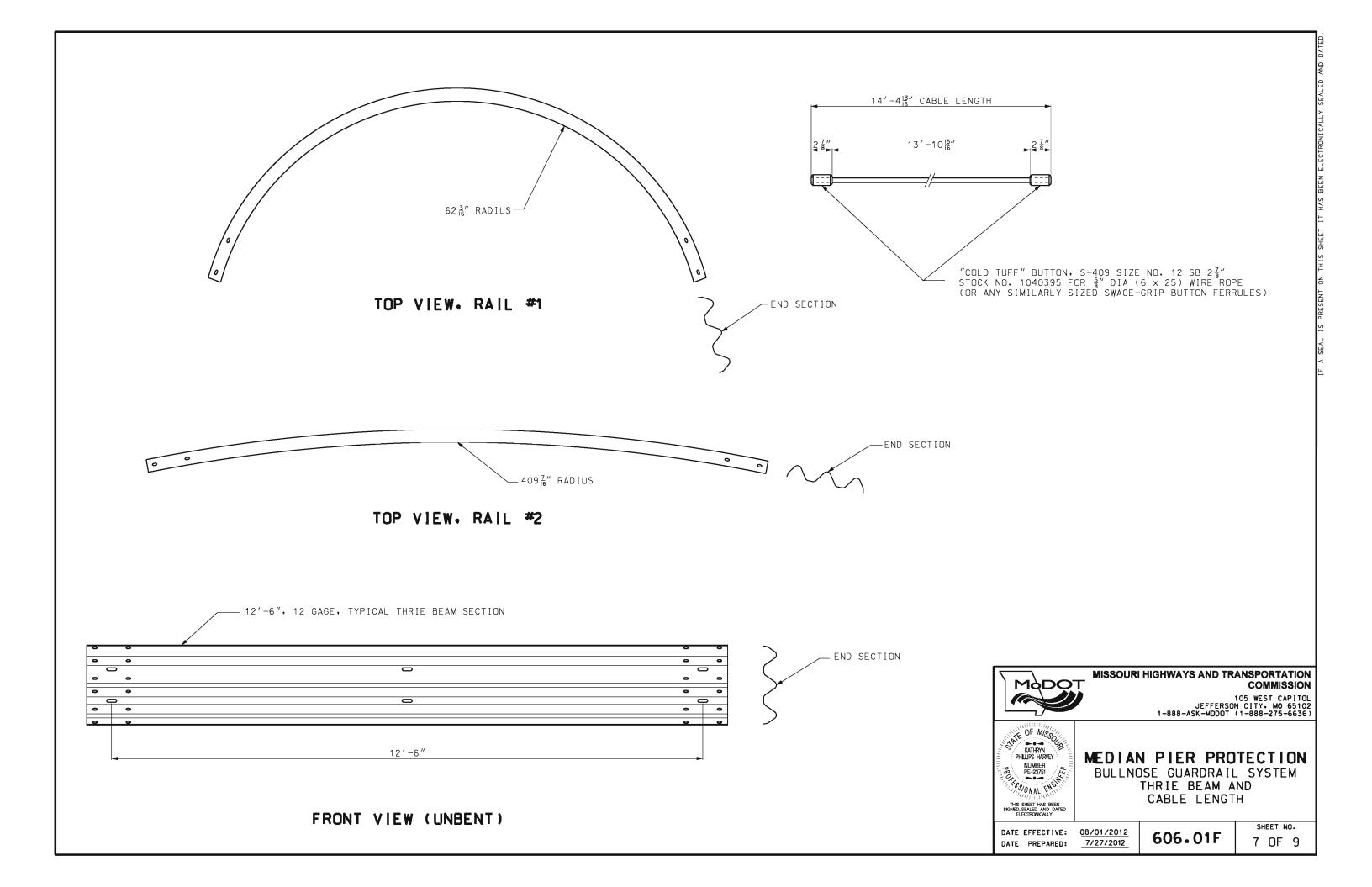
# MEDIAN PIER PROTECTION

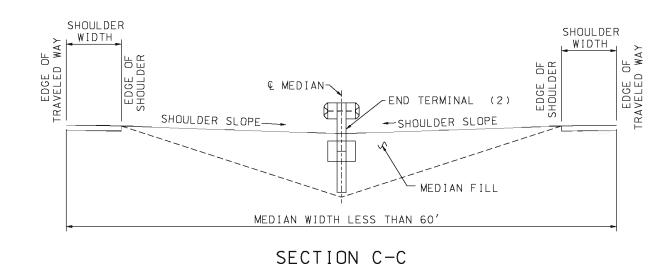
BULLNOSE GUARDRAILS SYSTEM PLATES AND CABLE ASSEMBLY

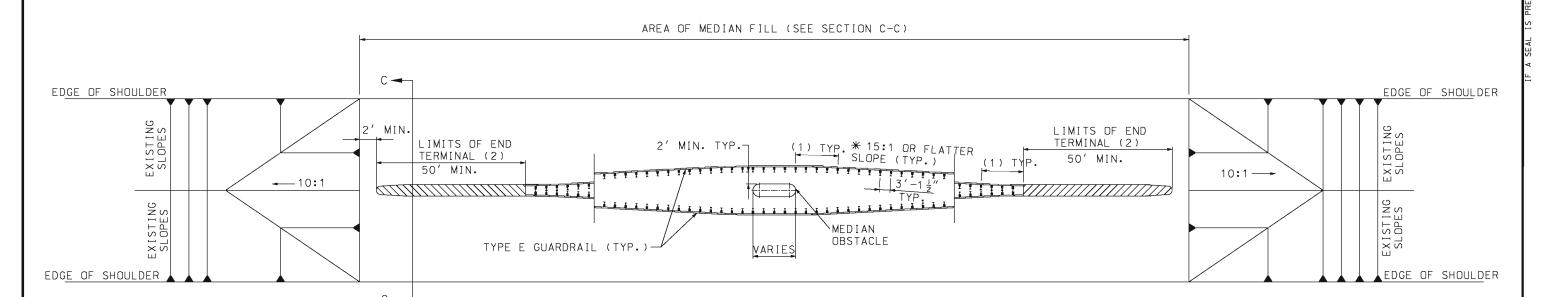
DATE EFFECTIVE: 08/01/2012 DATE PREPARED:

606.01F

SHEET NO. 6 OF 9







- (1) TYPE E GUARDRAIL 12'-6" IN LENGTH AND FACTORY FORMED TO THE REQUIRED RADIUS.
- (2) PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR ANY TRANSITION SECTIONS, BACKUP ASSEMBLIES, OR OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.
- VARY SLOPE NO STEEPER THAN 15:1 TO UTILIZE A FULL 12.5' LENGTH OF GUARDRAIL WHEN ATTACHING TO THE CRASHWORTHY END TERMINAL.

GENERAL NOTES:

TYPE B CRASHWORTHY END TERMINAL SHALL BE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMENDATIONS.



### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY MO 65102 1-888-ASK-MODOT (1-888-275-6636)



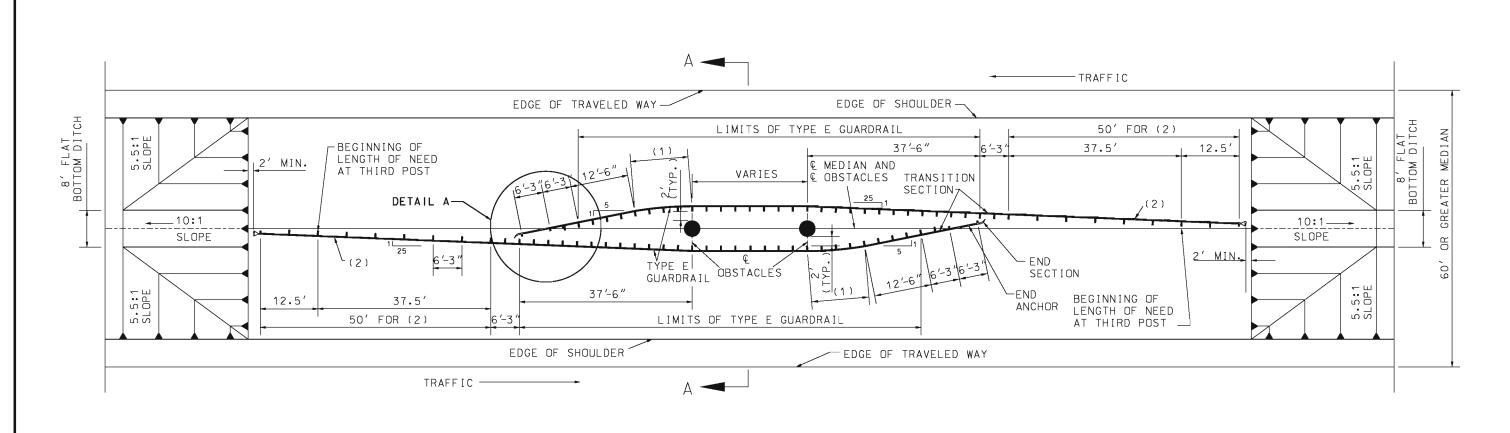
# TYPE E MEDIAN PIER PROTECTION

MEDIAN LESS THAN 60'

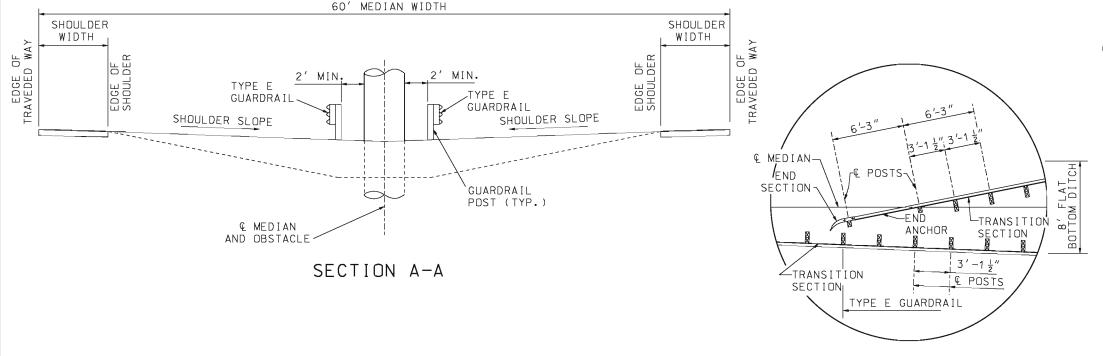
DATE EFFECTIVE: 08/01/2012 DATE PREPARED:

606.01F

SHEET NO. 8 OF 9



## PIER AT & OF MEDIAN



DETAIL A

- (1) TYPE E GUARDRAIL IN THIS REGION SHALL BE 12'6" IN LENGTH AND FACTORY FORMED TO A 75' RADIUS.
- (2) TYPE A NON-FLARED CRASHWORTHY END TREATMENT.

### GENERAL NOTES:

WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL. END ANCHOR SECTION TO BE USED ON TERMINAL END OF TYPE E GUARDRAIL.

END ANCHOR TO BE LOCATED EYOND THE LONGITUDINAL LIMITS OF TYPE A NON-FLARED CRASHWORTHY END TERMINAL.

TYPE A NON-FLARED CRASHWORTHY END TERMINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.



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# TYPE E MEDIAN PIER PROTECTION

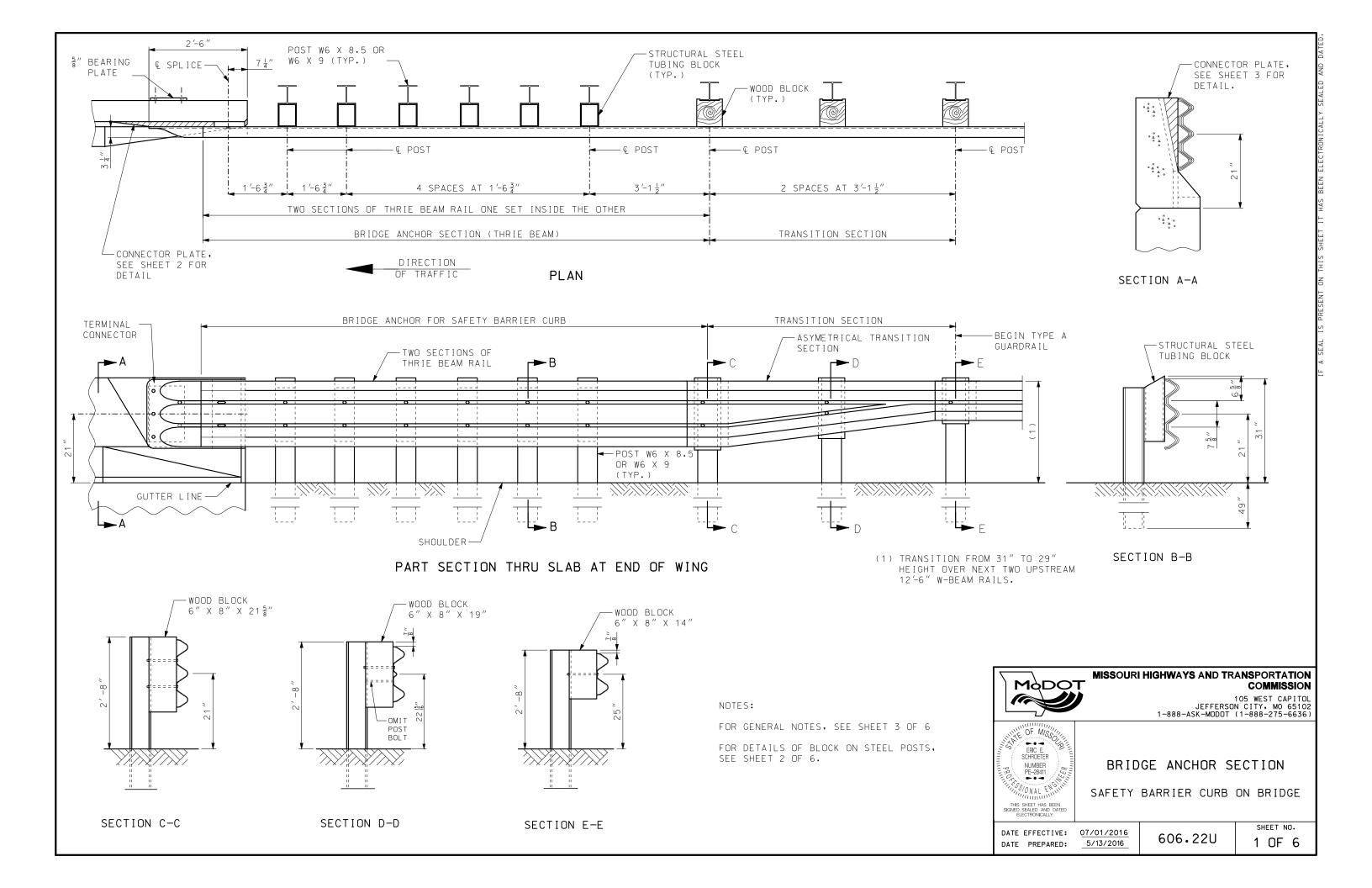
60' MEDIAN OR GREATER

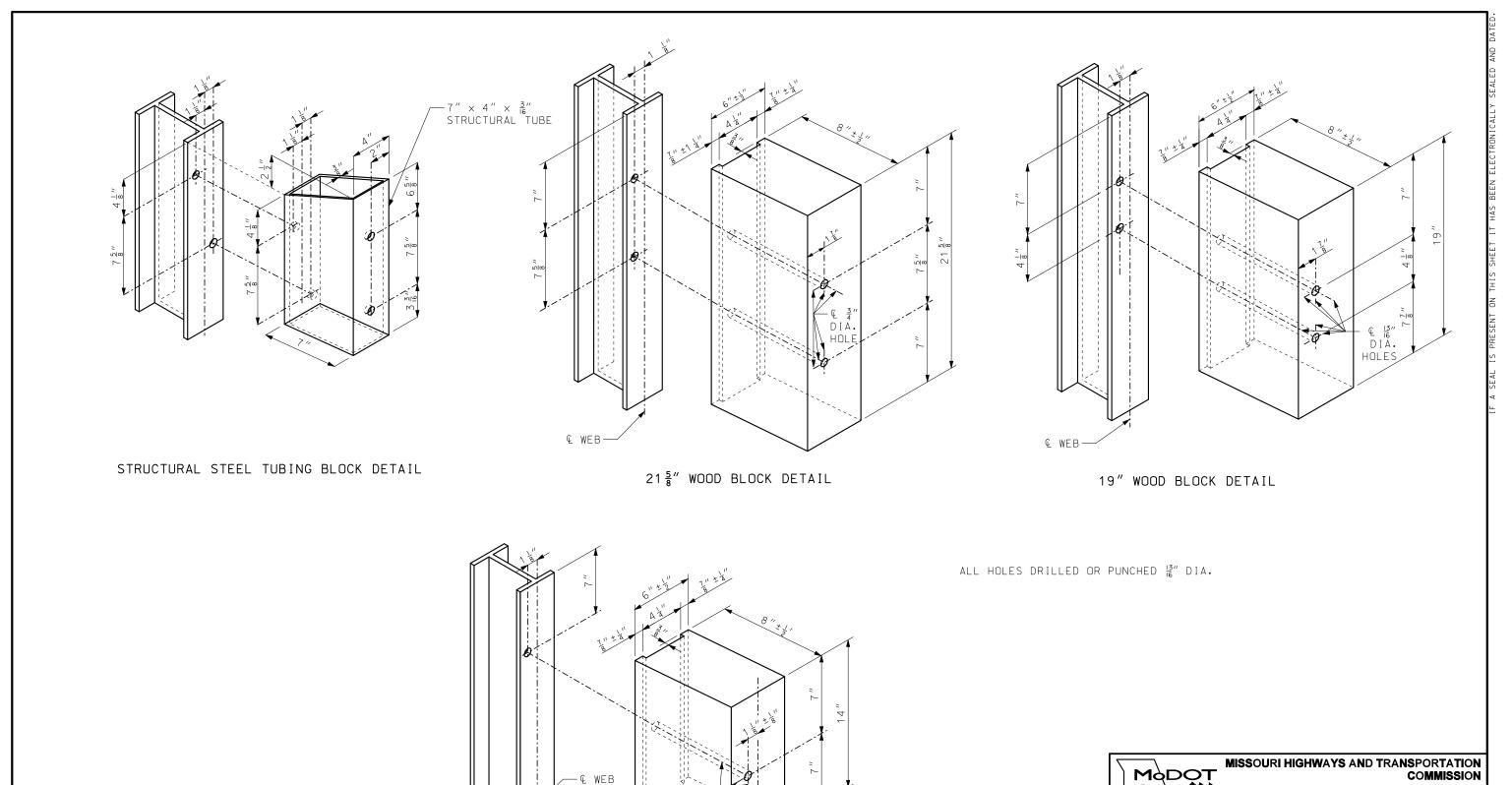
DATE EFFECTIVE: 08/01/2012 DATE PREPARED:

7/27/2012

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SHEET NO. 9 OF 9





— € BLOCK

14" WOOD BLOCK DETAIL



105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE

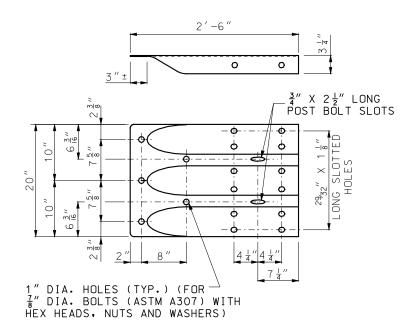
DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

606.22U

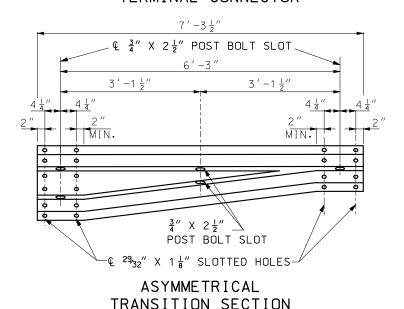
SHEET NO. 2 OF 6

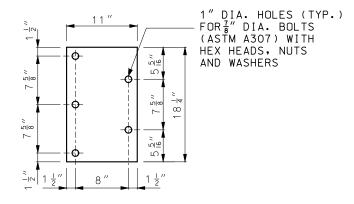
### THRIE BEAM RAIL SPLICE AT POST

(1) THE CONTRACTOR MAY, AT HIS OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.

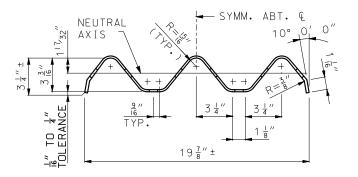


### TERMINAL CONNECTOR





## BEARING PLATE



SECTION THROUGH THRIE BEAM RAIL

GENERAL NOTES:

DESIGN BASED ON NCHRP REPORT 350 TEST LEVEL 3.

THE THRIE BEAM RAIL, TERMINAL CONNECTOR AND THE TRANSITION SECTION FOR THE BRIDGE ANCHOR SECTION SHALL BE MADE OF STEEL AND SHLL BE 12 GAGE.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS. SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

STRUCTURAL TUBING BLOCK SHALL BE FABRICATED FROM ASTM A500 BRADE B STEEL AND GALVANIZED.

USE  $\frac{5}{8}''$  BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS =  $\frac{3}{8}$ "

THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

SEE STANDARD PLAN 606.00 FOR DETAILS NOT SHOWN.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (SAFETY BARRIER CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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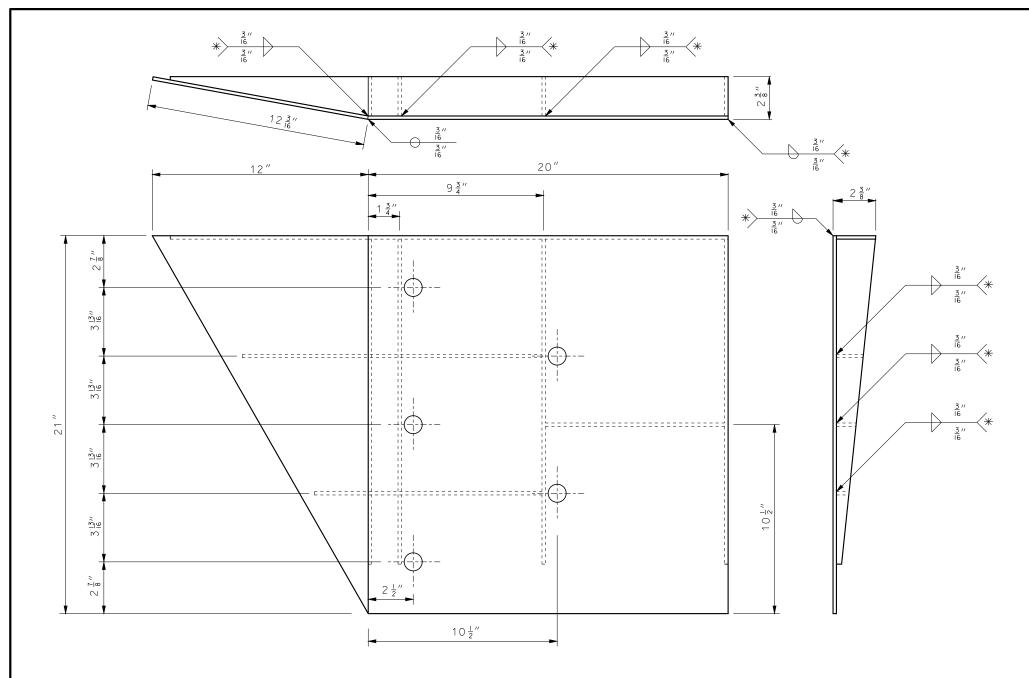
BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE

DATE EFFECTIVE: 07/01/2016 DATE PREPARED:

5/13/2016

606.22U

SHEET NO. 3 OF 6



### WELDING INSTRUCTION

\* ALL FILLET WELDS SHALL BE 1" LONG SPACED AT 2".

GENERAL NOTES:

COVER PLATE PANELS ARE 4.3" THICK.

ALL STIFFENERS ARE 4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".



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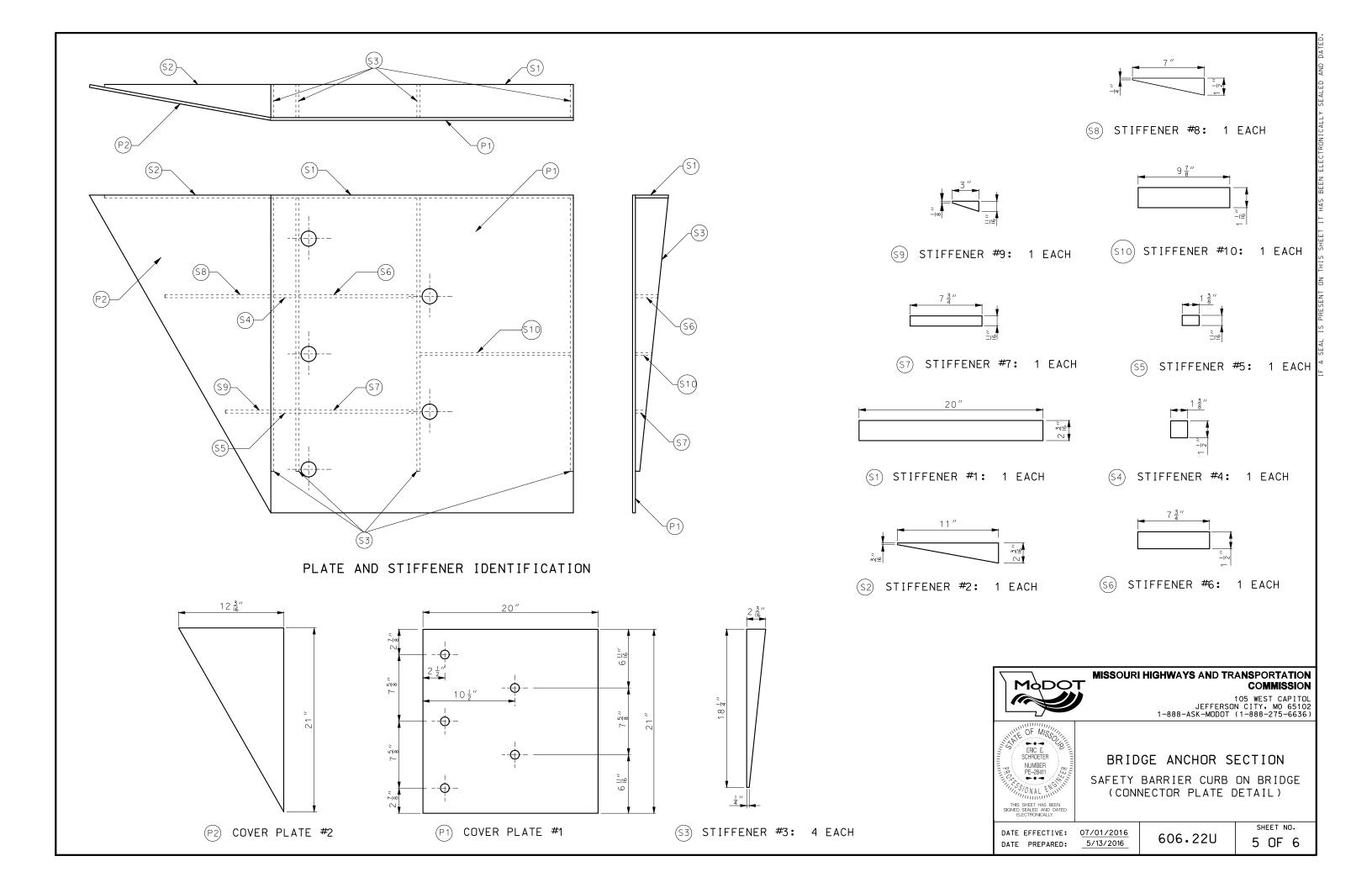


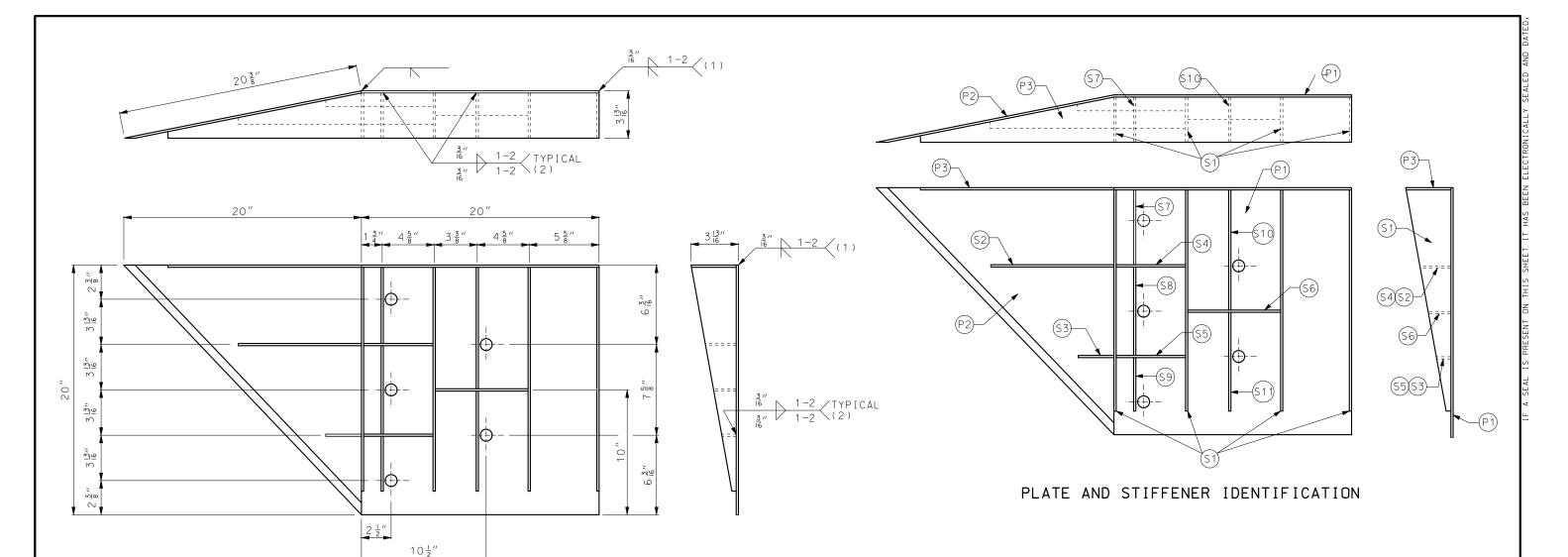
BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE (CONNECTOR PLATE DETAIL)

DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016

606.22U

SHEET NO. 4 OF 6





### WELDING INSTRUCTION

- (1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS: SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND  $\frac{3}{16}''$ FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS: 3" FILLET WELD BY 1" LONG SPACED AT 2".

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A $\times$ B $\times$ C $\times$ D)	THICKNESS
P1	1	A B	20" × 20"	<u>3</u> //
P2	1	A C	20" × 20" × 28 <sup>9</sup> / <sub>16</sub> "	<u>3</u> //
Р3	1	A D	$39" \times 3\frac{5}{8}" \times 20" \times 19\frac{5}{16}"$	<u>3</u> "
S1	4	BAC	$18\frac{7}{16}$ " × $3\frac{5}{8}$ " × $18\frac{3}{4}$ "	<u>  "</u>
S2	1	$B \subset D$	$10\frac{1}{4}$ " × $2\frac{7}{16}$ " × $10\frac{3}{8}$ " × $\frac{1}{2}$ "	<u> </u> ''
S3	1	B₽D	$3'' \times 1\frac{1}{16}'' \times 3\frac{1}{8}'' \times \frac{1}{2}''$	<u>  "</u>
S4	1	вД	$6\frac{1}{8}'' \times 2\frac{7}{16}''$	<u>  "</u>
S5	1	вД	6 ½" × 1 ½"	<u>  "</u>
S6	1	вД	$7\frac{3}{4}'' \times 1\frac{3}{4}''$	1/4
S7	1		$2\frac{9}{16}$ " × 6" × $3\frac{5}{8}$ " × $5\frac{7}{8}$ "	1/4
S8	1		$1^{5}_{32}$ " × $7\frac{1}{2}$ " × $2\frac{1}{2}$ " × $7\frac{3}{8}$ "	<u>  ''</u>
S9	1	C B	$6\frac{1}{16}$ " × $6\frac{3}{16}$ " × $1\frac{3}{32}$ "	<u> </u> "
S10	1		$1\frac{7}{8}$ × $9\frac{7}{8}$ × $3\frac{5}{8}$ × $9\frac{11}{16}$	<u>1</u> "
S11	1	C B	$8\frac{1}{2}$ " $\times$ $8\frac{3}{4}$ " $\times$ $1\frac{13}{16}$ "	<u>  "</u>

GENERAL NOTES:

COVER PLATE PANELS ARE 3" THICK.

ALL STIFFENERS ARE  $\frac{1}{4}$ " THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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BRIDGE ANCHOR SECTION

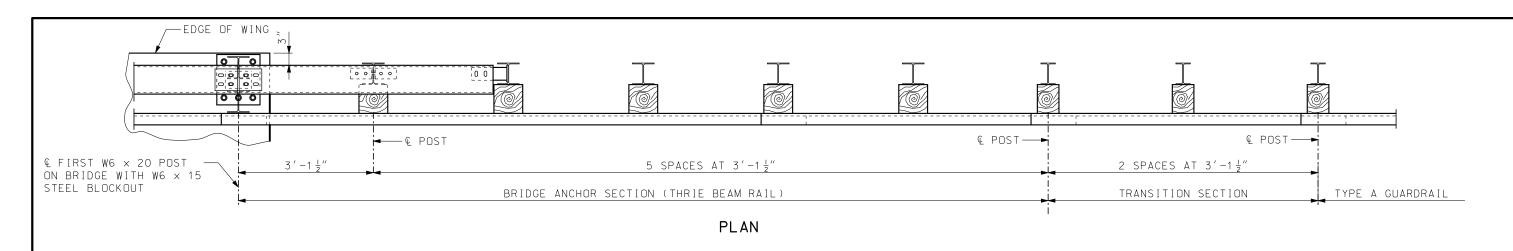
SAFETY BARRIER CURB ON BRIDGE (CONNECTOR PLATE DETAIL) SINGLE SLOPE BARRIERS

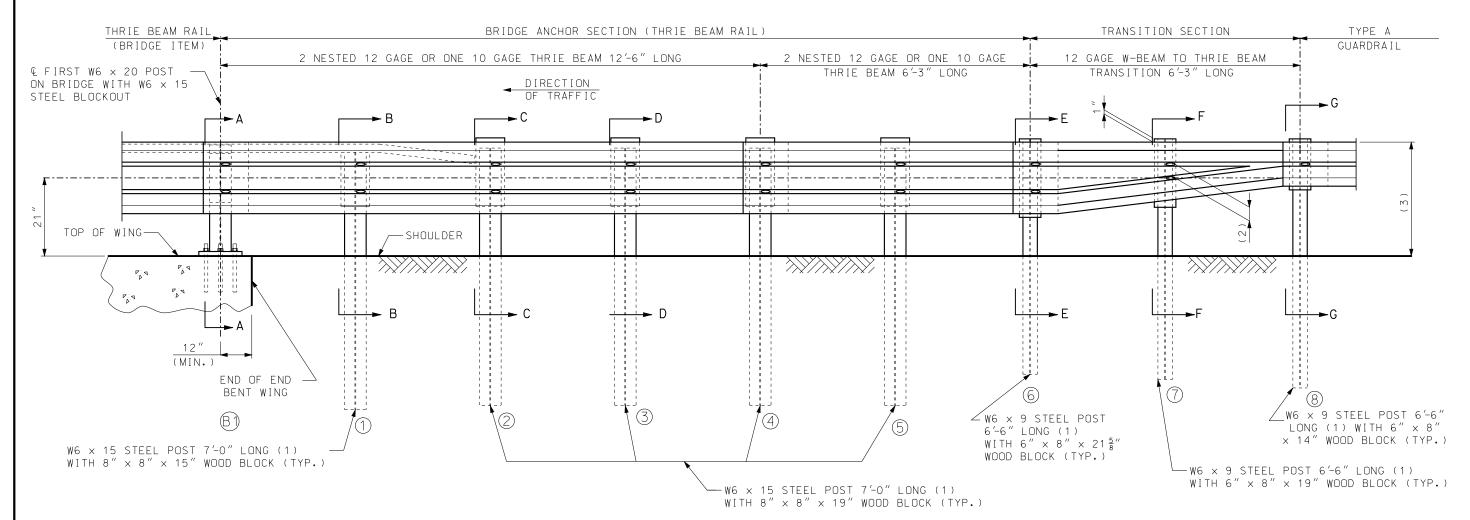
DATE PREPARED: 5/13/2016

DATE EFFECTIVE: 07/01/2016

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SHEET NO. 6 OF 6





### PART SECTION THROUGH SLAB AT END OF WING

- (1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.
- (2) VERIFY BY RAIL TRANSITION PRODUCER.
- (3) TRANSITION FROM 31" TO 29" HEIGHT OVER NEXT TWO UPSTREAM 12'-6" W-BEAM

# MODOT

### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE)

DATE EFFECTIVE: 7/01/016 DATE PREPARED:

5/13/2016

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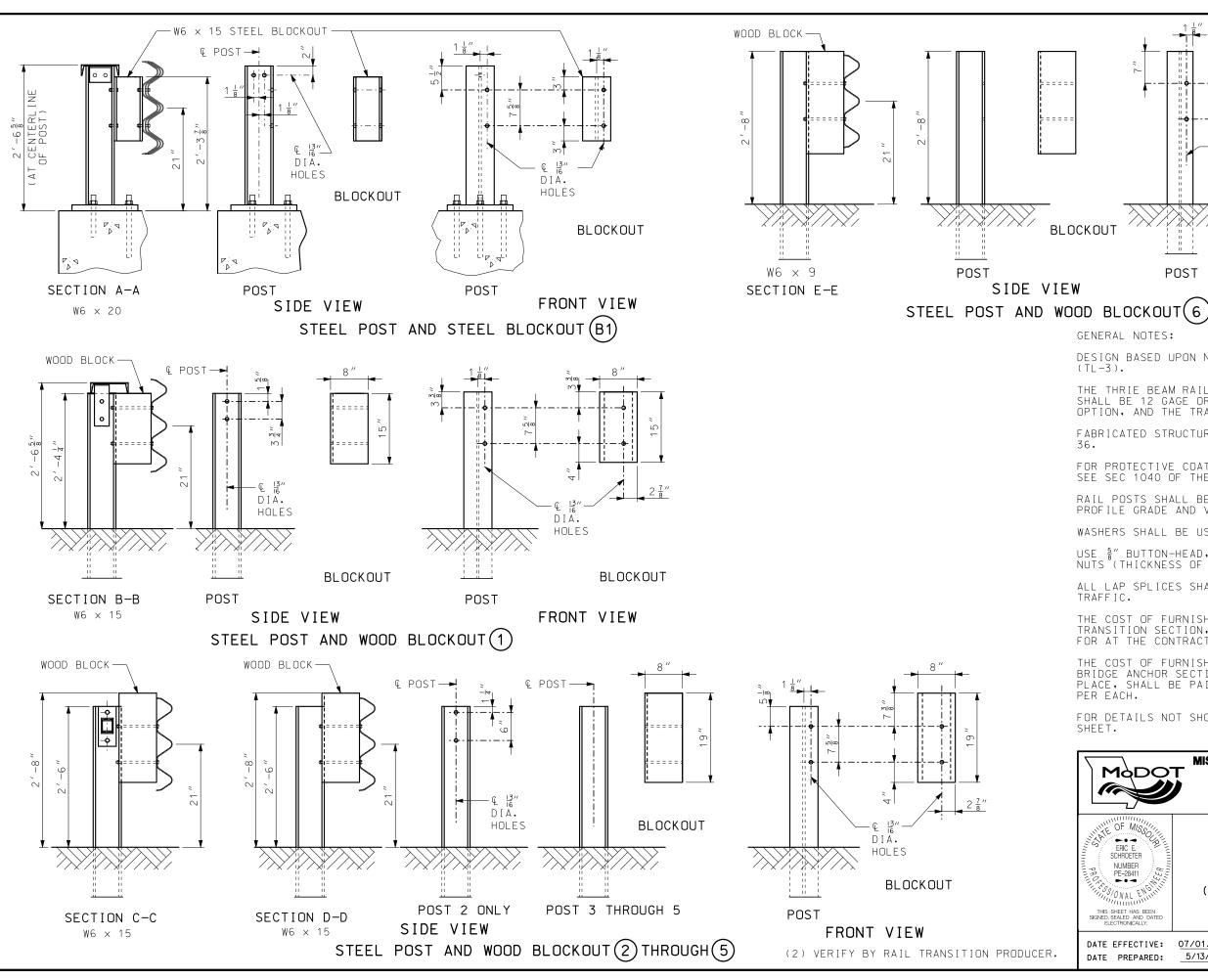
SHEET NO. 1 OF 5

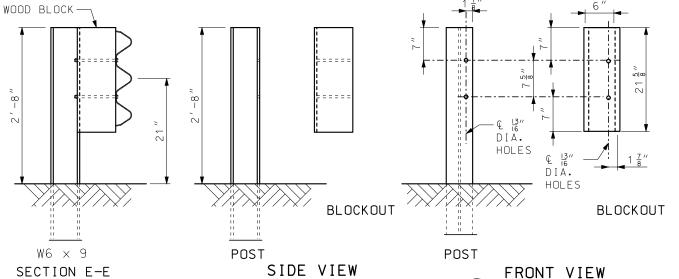
### NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

RAILS.





GENERAL NOTES:

DESIGN BASED UPON NCHRP REPORT 350 TEST LEVEL 3

THE THRIE BEAM RAIL FOR THE BRIDGE ANCHOR SECTION SHALL BE 12 GAGE OR 10 GAGE AT THE CONTRACTOR'S OPTION, AND THE TRANSITION SECTION SHALL BE 12 GAGE.

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

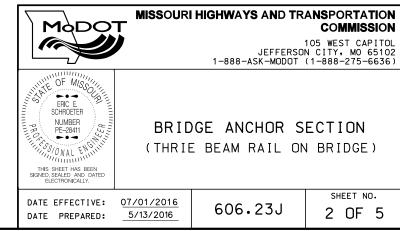
USE  $\frac{5}{8}''$  BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS =  $\frac{3}{8}''$  MIN.) AT ALL SLOTS.

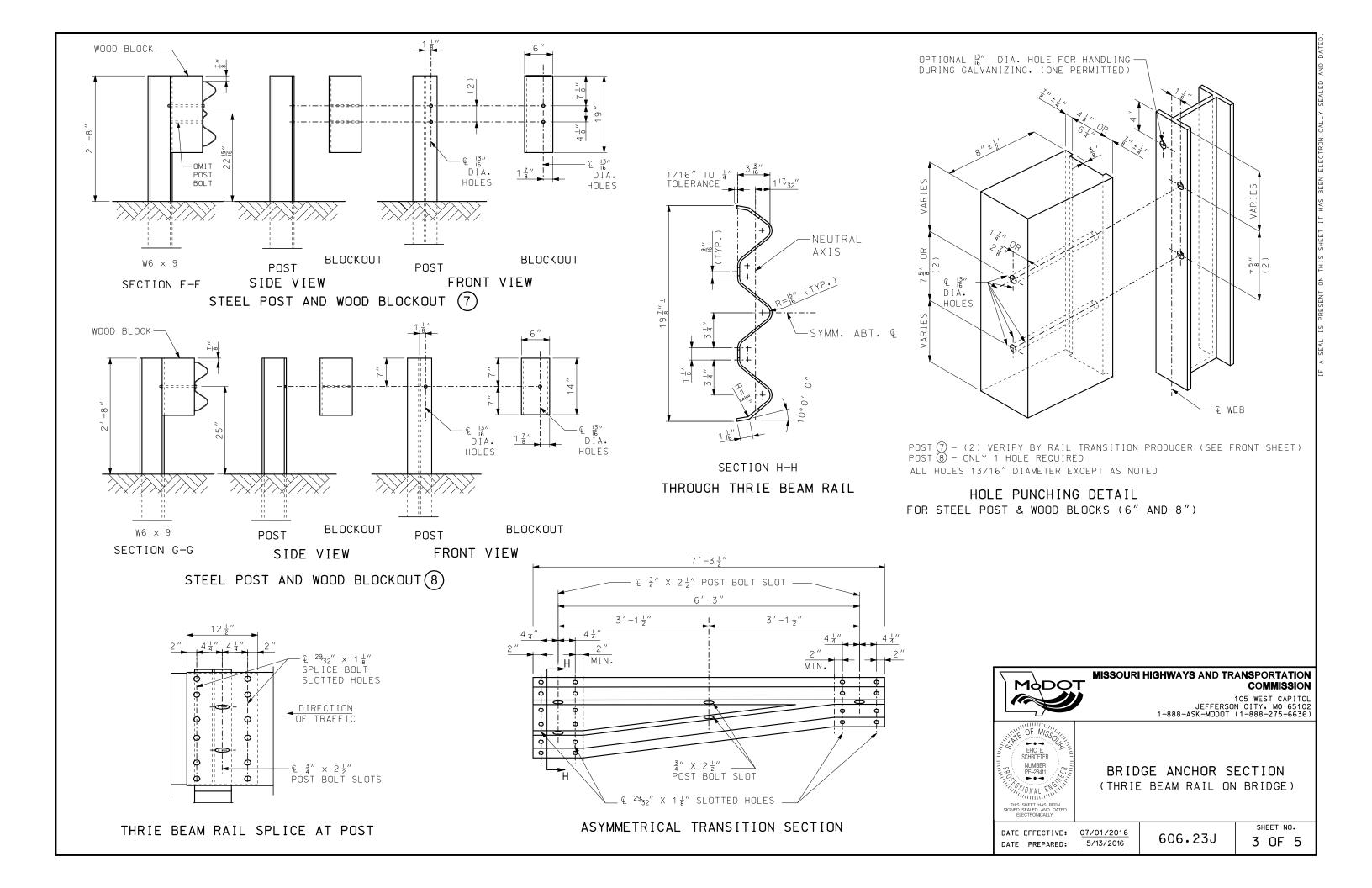
ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

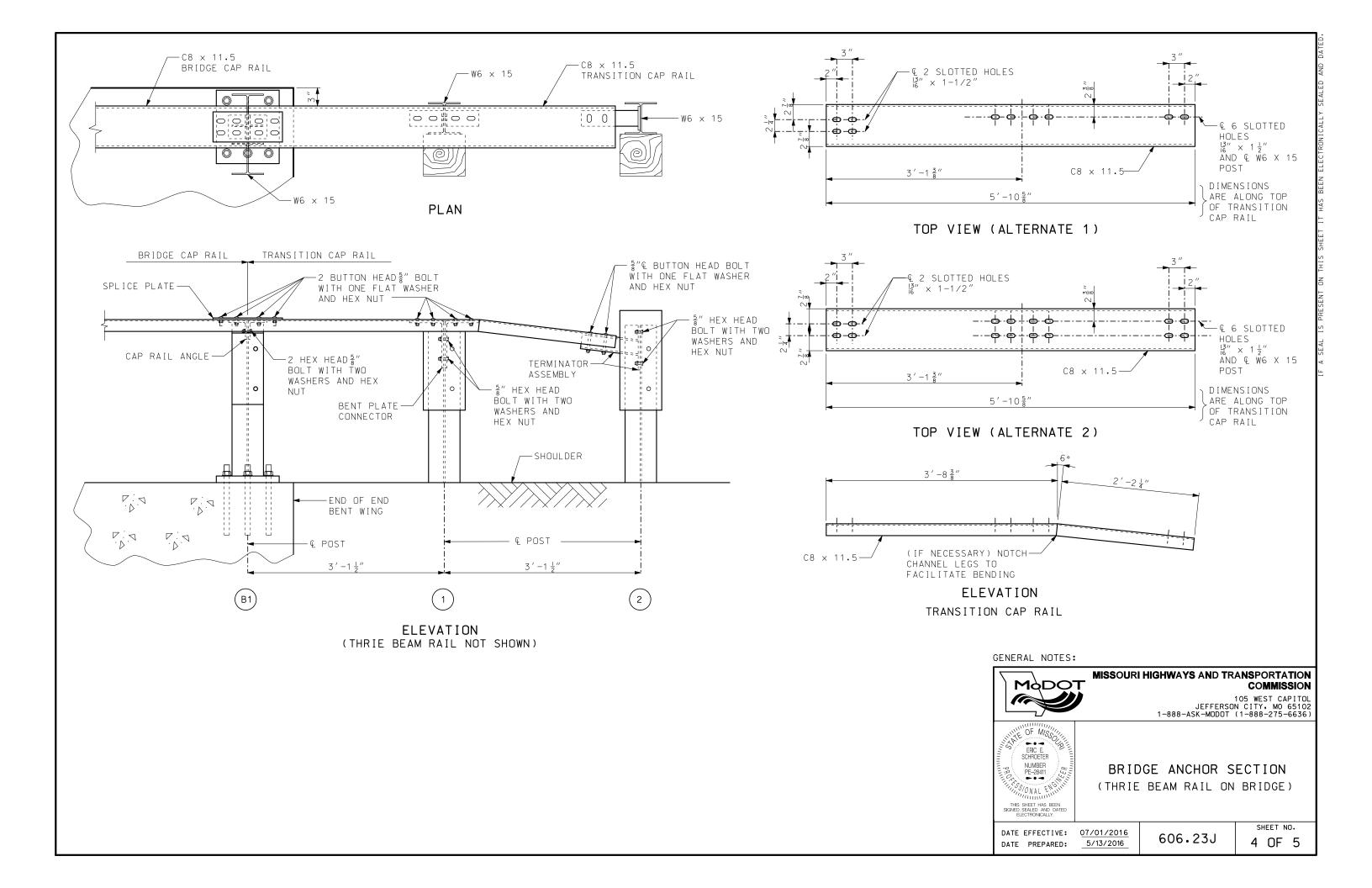
THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

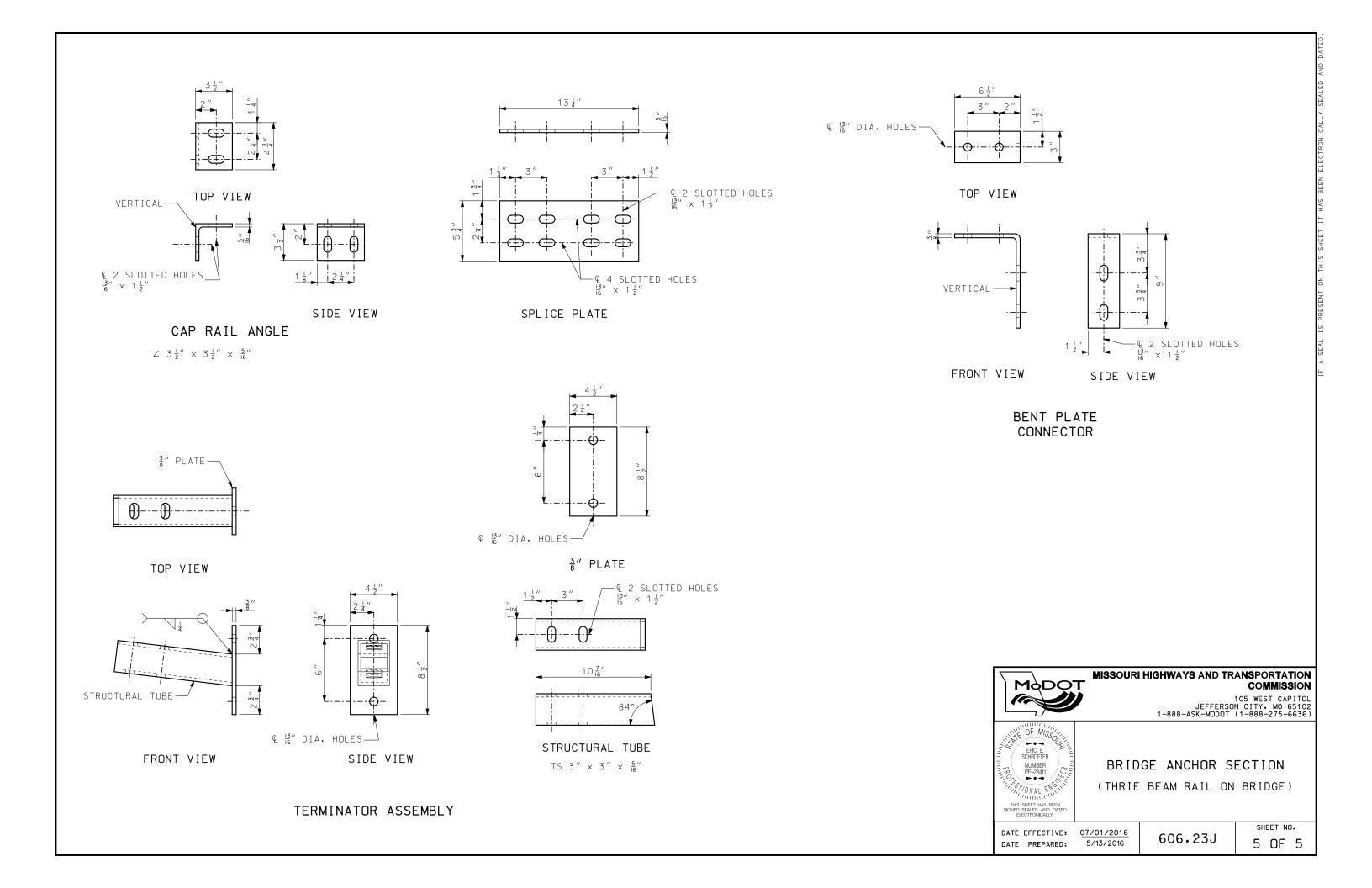
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

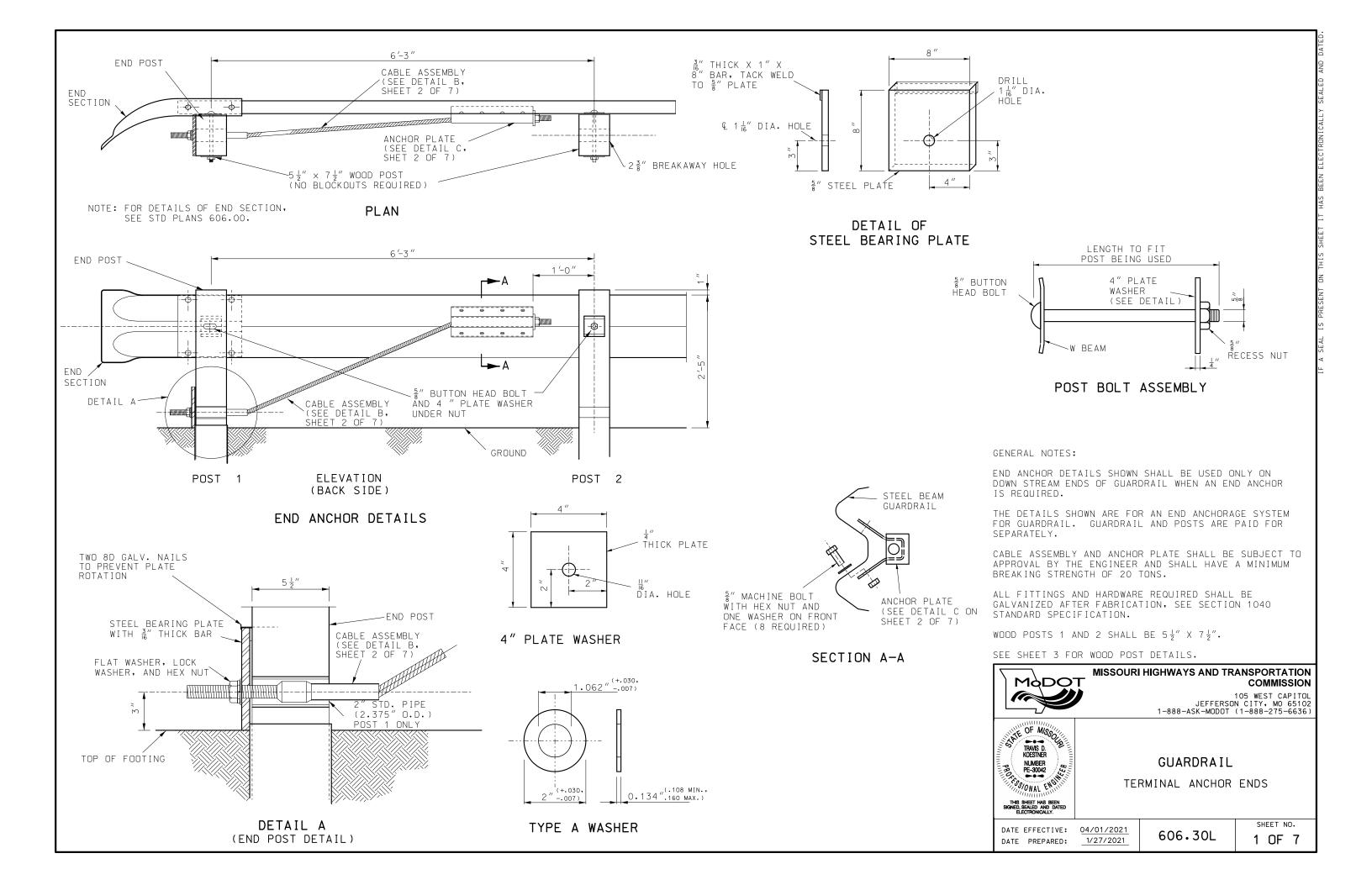
FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL

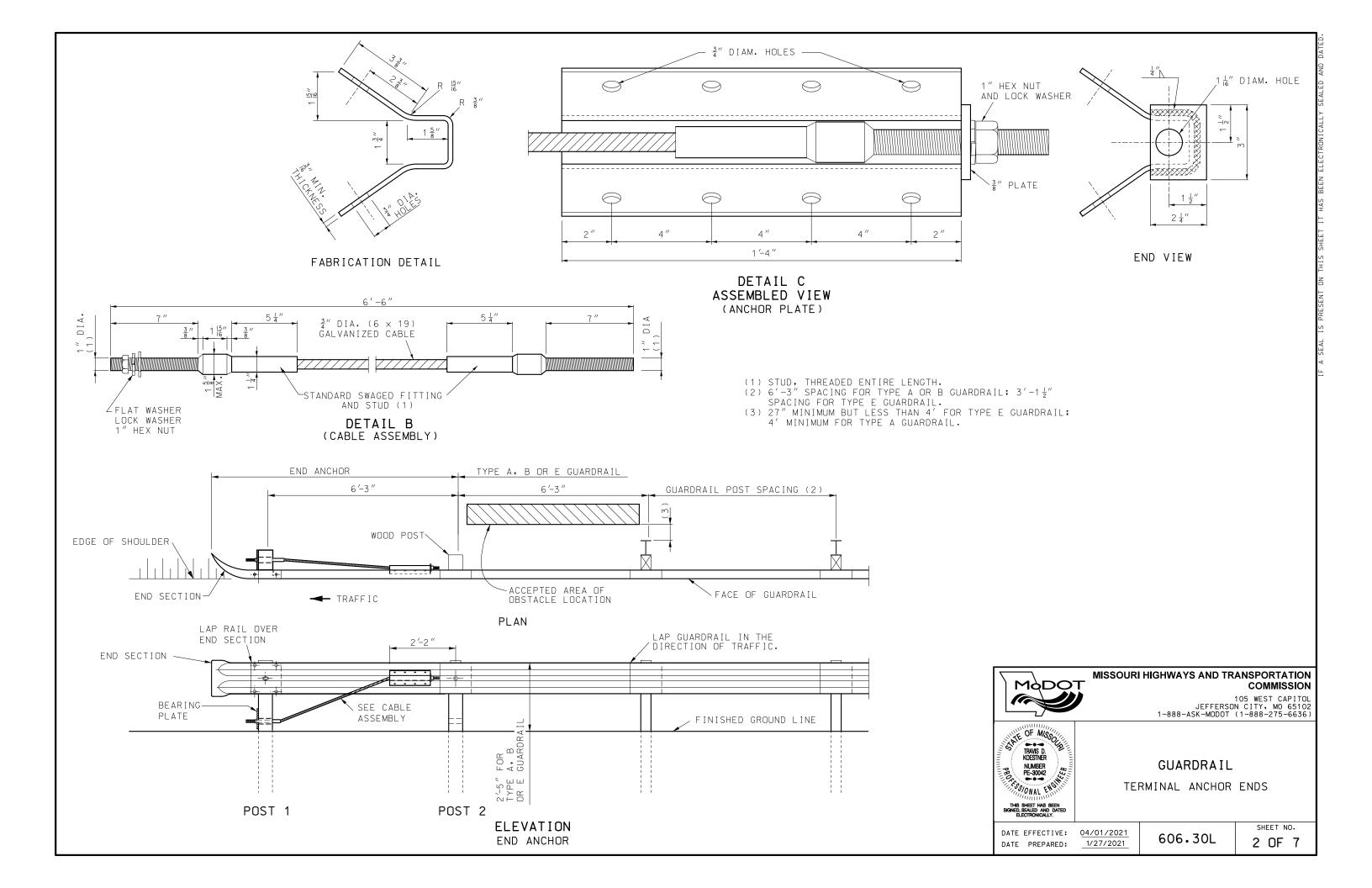








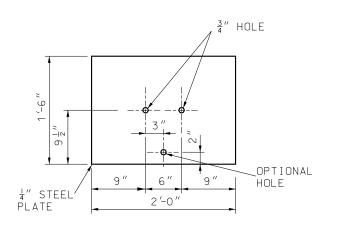




# GROUND LINE 6" X 6" WELDED WIRE REINFORCEMENT TWO SIDES OF POST SHALL BE FACED WITH ONE LAYER OF $\frac{3}{4}$ " THICK EXPANDED POLYSTYRENE FOAM SHEETING AND ONE WRAP OF LIGHT-WEIGHT BUILDING PAPER, TOP ONE INCH TO BE FILLED WITH BUTYL RUBBER CAULKING (COMMERCIAL GRADE OF OTHER APPROVED WATER 24" PROOF MATERIAL. POST 1 CONCRETE FOUNDATION FOR END ANCHORS

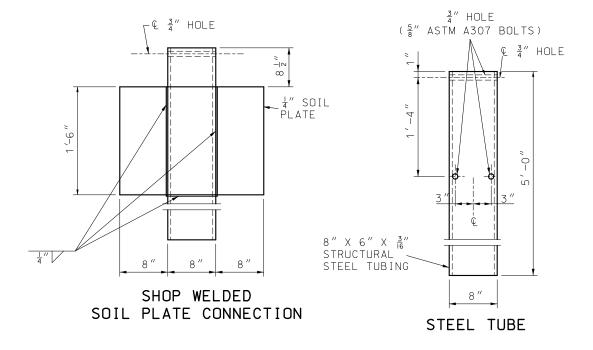
# 3" POLYSTYRENE FOAM 6" X 6" WELDED WIRE REINFORCEMENT END POST 24 INCH DIAMETER CONCRETE FOOTING

### SECTION A-A EXPANDED POLYSTYRENE FOAM INSTALLATION DETAIL



SOIL PLATE

# 2" STANDARD PIPE GROUND LINE \_\_\_\_\_\_ STEEL SOIL TUBE PLATE



### POST 1 STEEL TUBE FOUNDATION FOR END ANCHORS

BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1080 OF THE MISSOURI STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

# ³₄″ HOLE - -----5" BOLT 2 3/8 HOLE $3'-8\frac{1}{2}''$ GROUND LINE ³/″ HOLE (\$" ASTM ( 5 A307 BOLT) ′-3 <u>1</u> ″ STEEL TUBE FOUNDATION FRONT VIEW SIDE VIEW

### WOOD BREAKAWAY POST SEE SECTION 1050

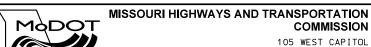
- (1)  $5'-11\frac{1}{2}''$  FOR CONCRETE FOUNDATION ALTERNATE.
- (2)  $3'-8\frac{1}{2}"$  FOR CONCRETE FOUNDATION ALTERNATE.

### GENERAL NOTES:

THE CONTRACTOR HAS THE OPTION TO INSTALL WOOD POST 1 AND 2 IN STEEL TUBE OR CONCRETE FOUNDATION.

TRIMMING OF WOOD POST MAY BE NECESSARY FOR STEEL TUBE FOUNDATION.

STEEL TUBE FOUNDATIONS SHALL BE DRILLED AND BACK-FILLED WITH A SUITABLE MATERIAL WHEN THE SOIL PLATE IS BOLTED, AS SHOWN, TO THE STEEL TUBE. STEEL TUBE FOUNDATION MAY BE DRIVEN WHEN THE SOIL PLATE IS WELDED, AS SHOWN, TO THE STEEL TUBE.



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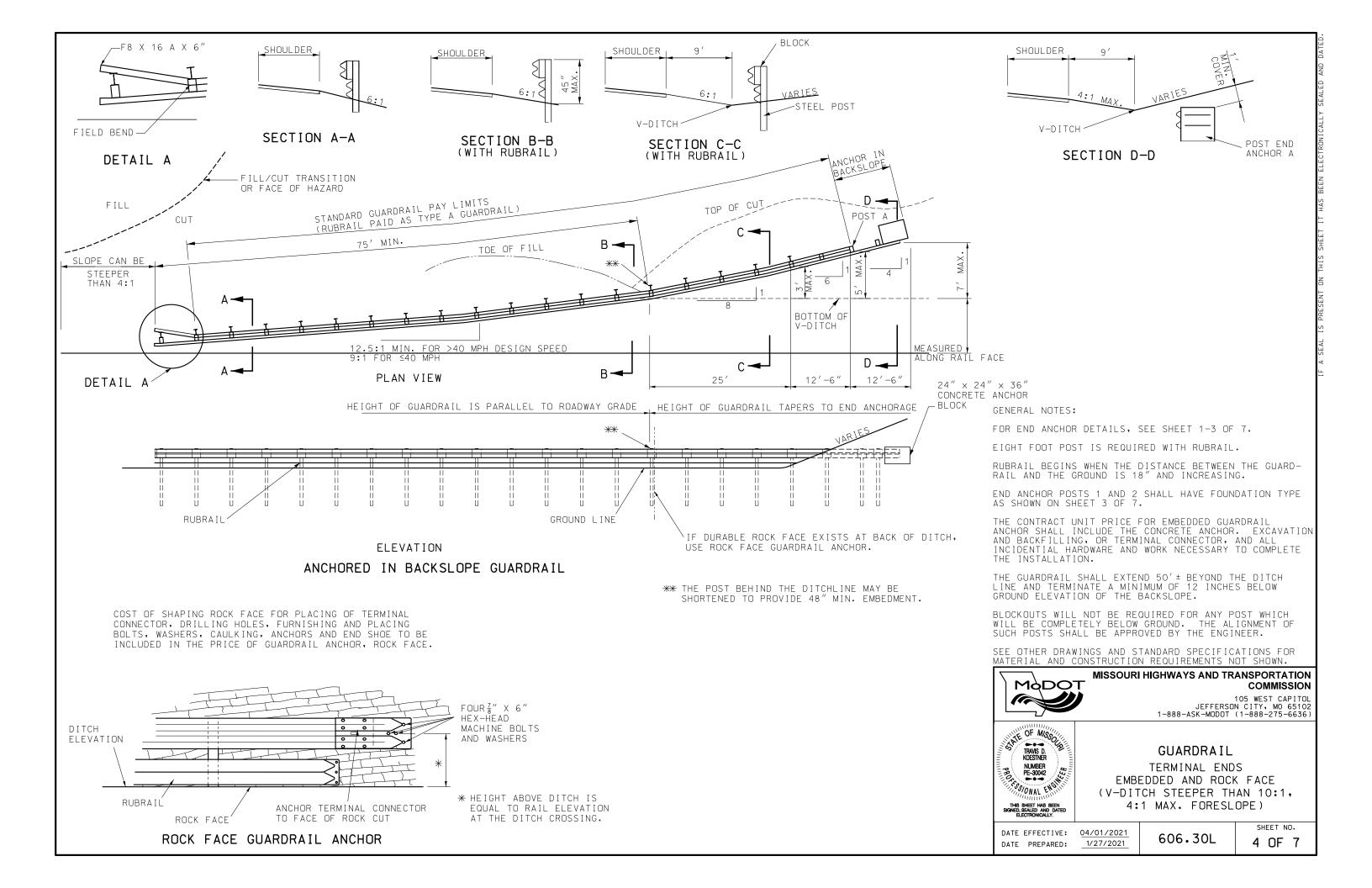
**GUARDRAIL** TERMINAL ANCHOR ENDS

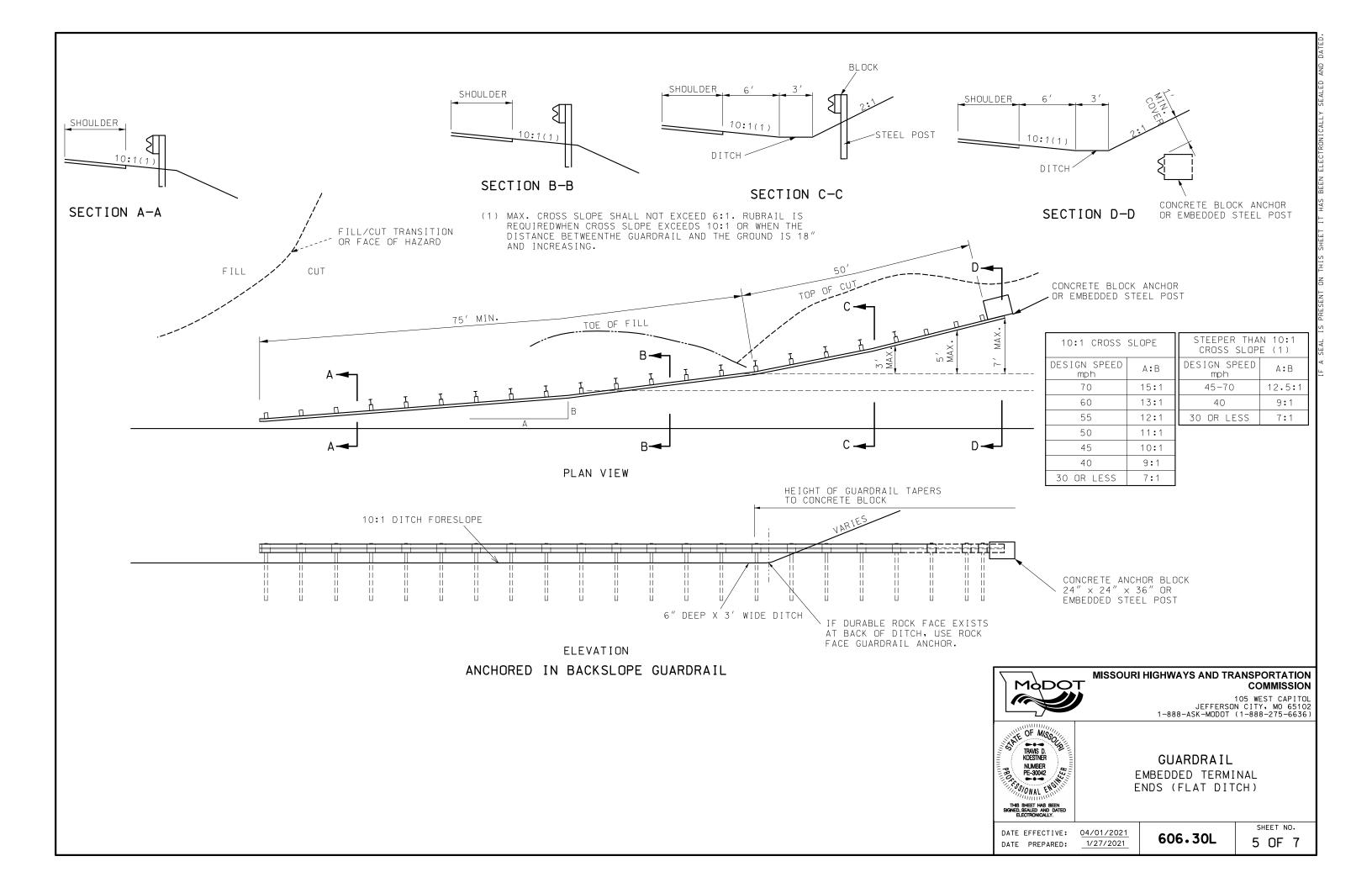
DATE EFFECTIVE: 04/01/2021 DATE PREPARED:

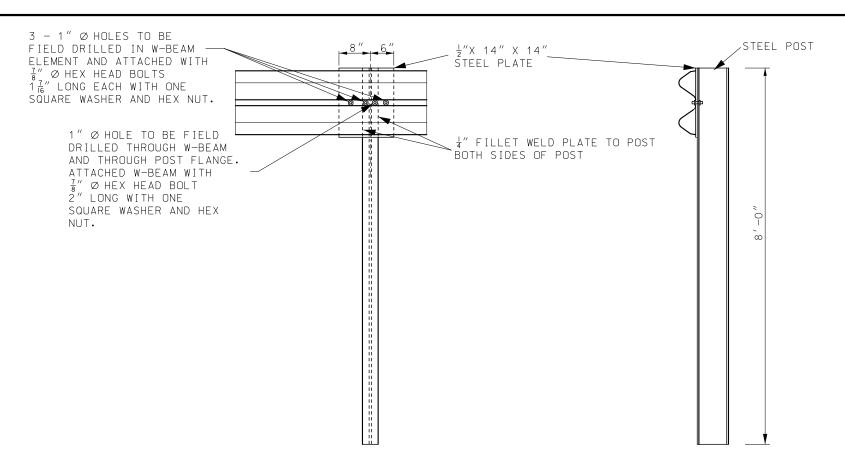
1/27/2021

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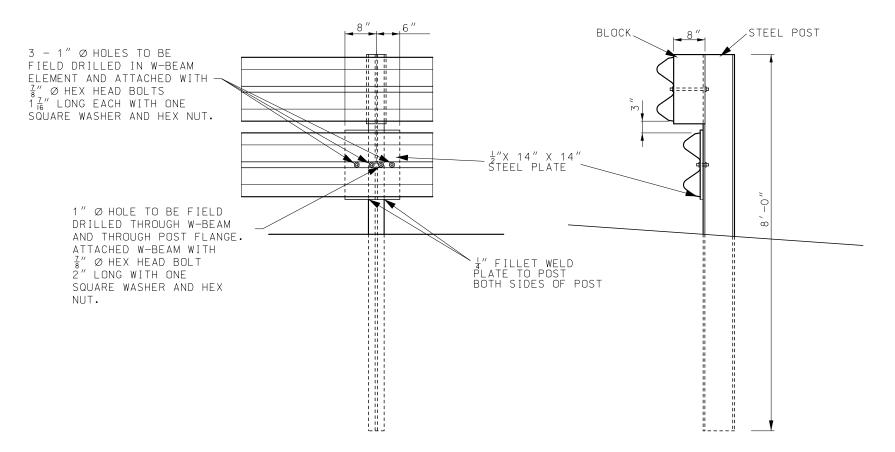
SHEET NO. 3 OF 7







### EMBEDDED STEEL POST



SPECIAL RUBRAIL TO POST CONNECTION AT POST A



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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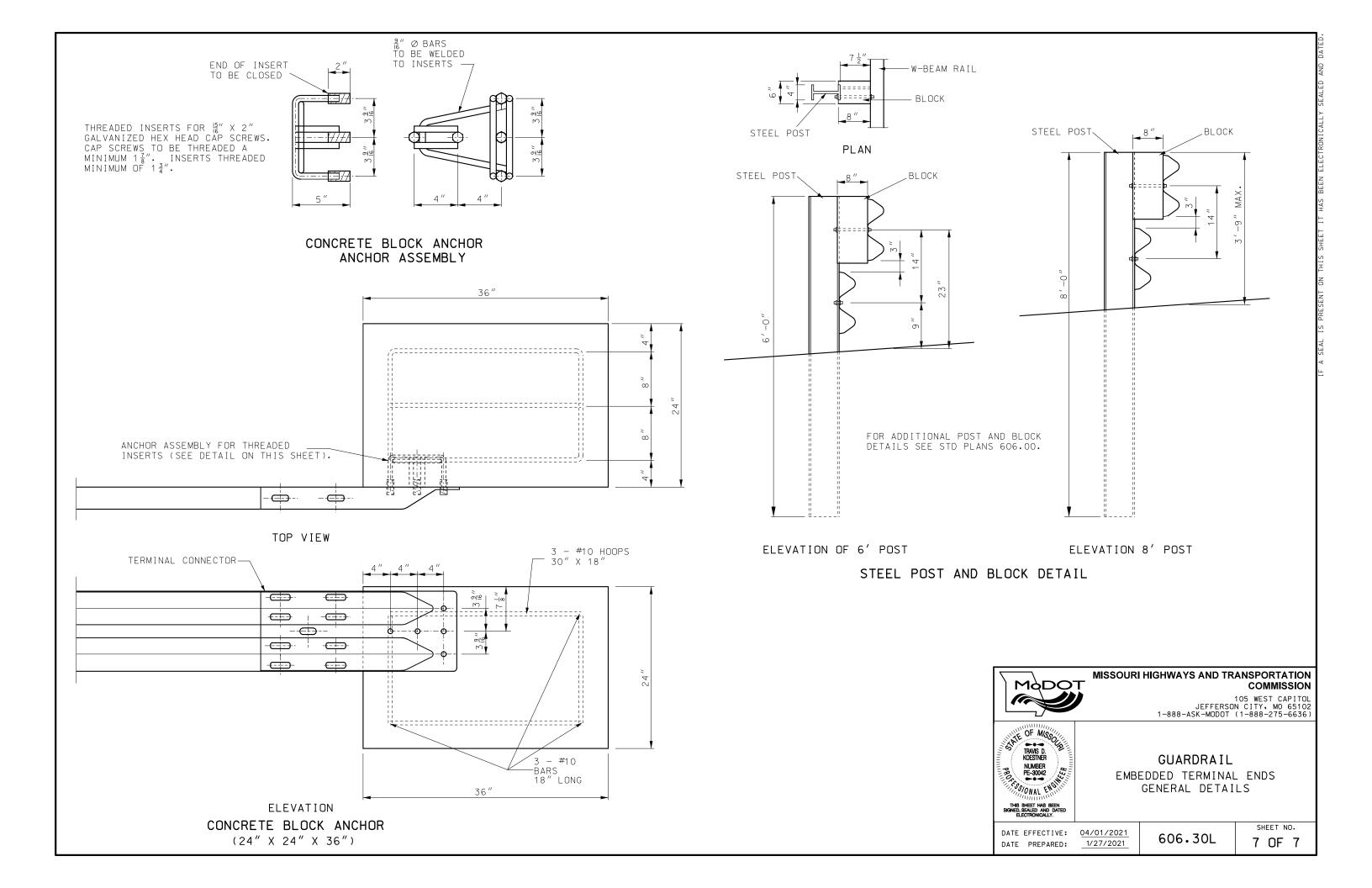


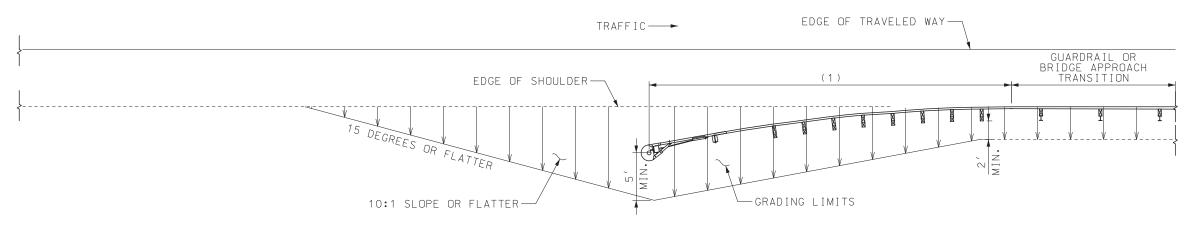
### GUARDRAIL EMBEDDED ANCHOR TERMINAL ENDS (STEEL POST OPTION)

DATE EFFECTIVE: 04/01/2021 DATE PREPARED: 1/27/2021

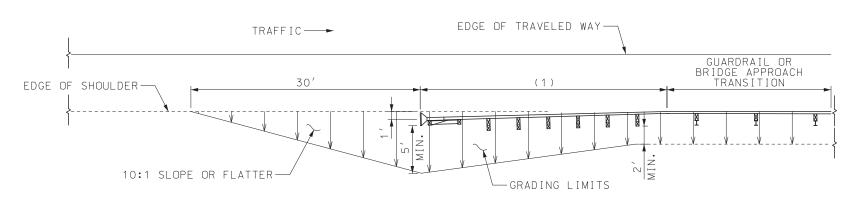
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SHEET NO. 6 OF 7

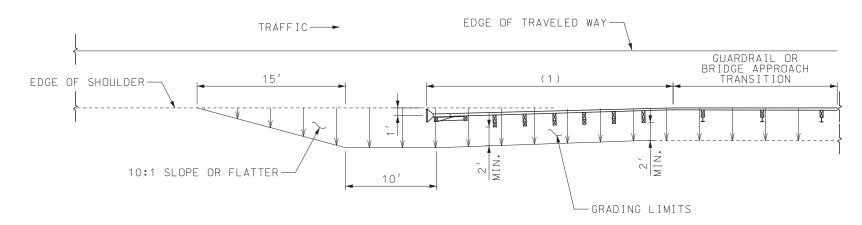




### GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



### STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



### ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS

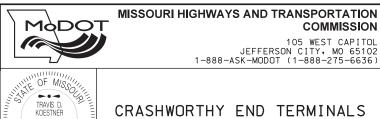
(1) APPROVED CRASHWORTHY END TERMINAL

### GENERAL NOTES:

STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE APPROVED CRASH-WORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED



# CRASHWORTHY END TERMINALS TYPE A

1,55/ONAL ENGIN

NUMBER PE-30042

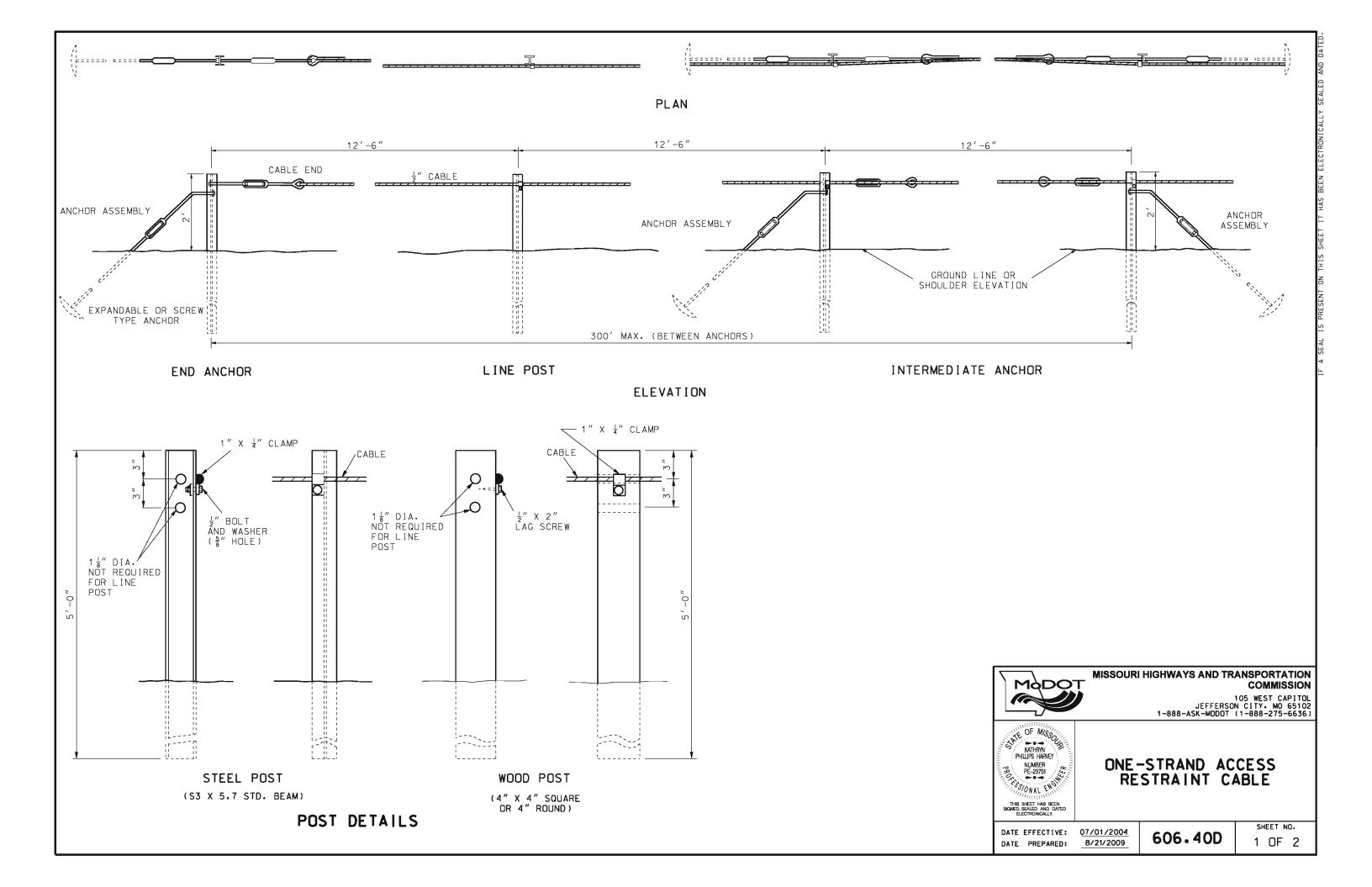
GRADING LIMITS

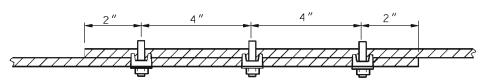
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SHEET NO. 1 OF 1

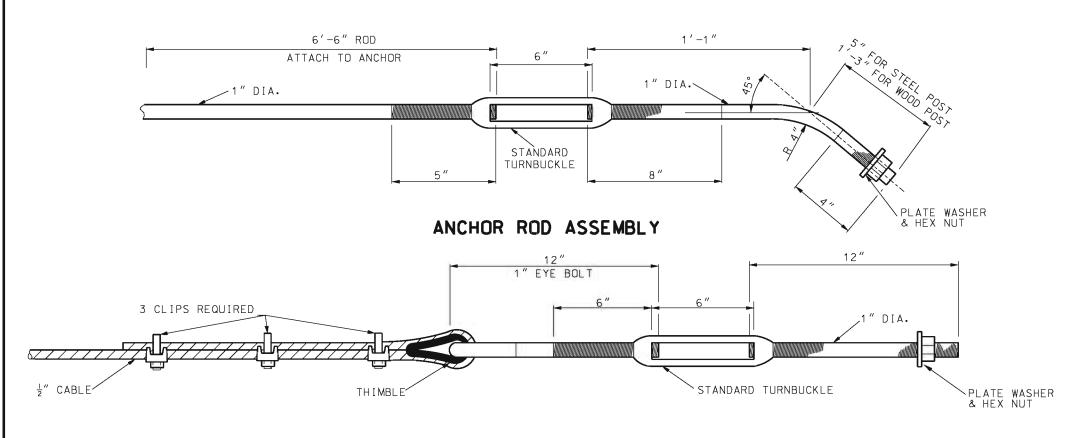
COMMISSION



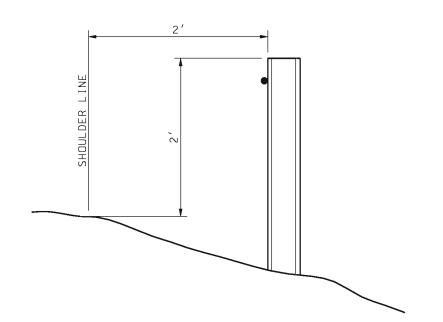


ACCESS-RESTRAINT CABLE GREATER THAN 300 FEET IN LENGTH REQUIRES AN INTER-MEDIATE ANCHOR AS SHOWN.

# SPLICE DETAIL







TYPICAL LOCATION
SHOULDER INSTALLATION



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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ONE-STRAND ACCESS RESTRAINT CABLE

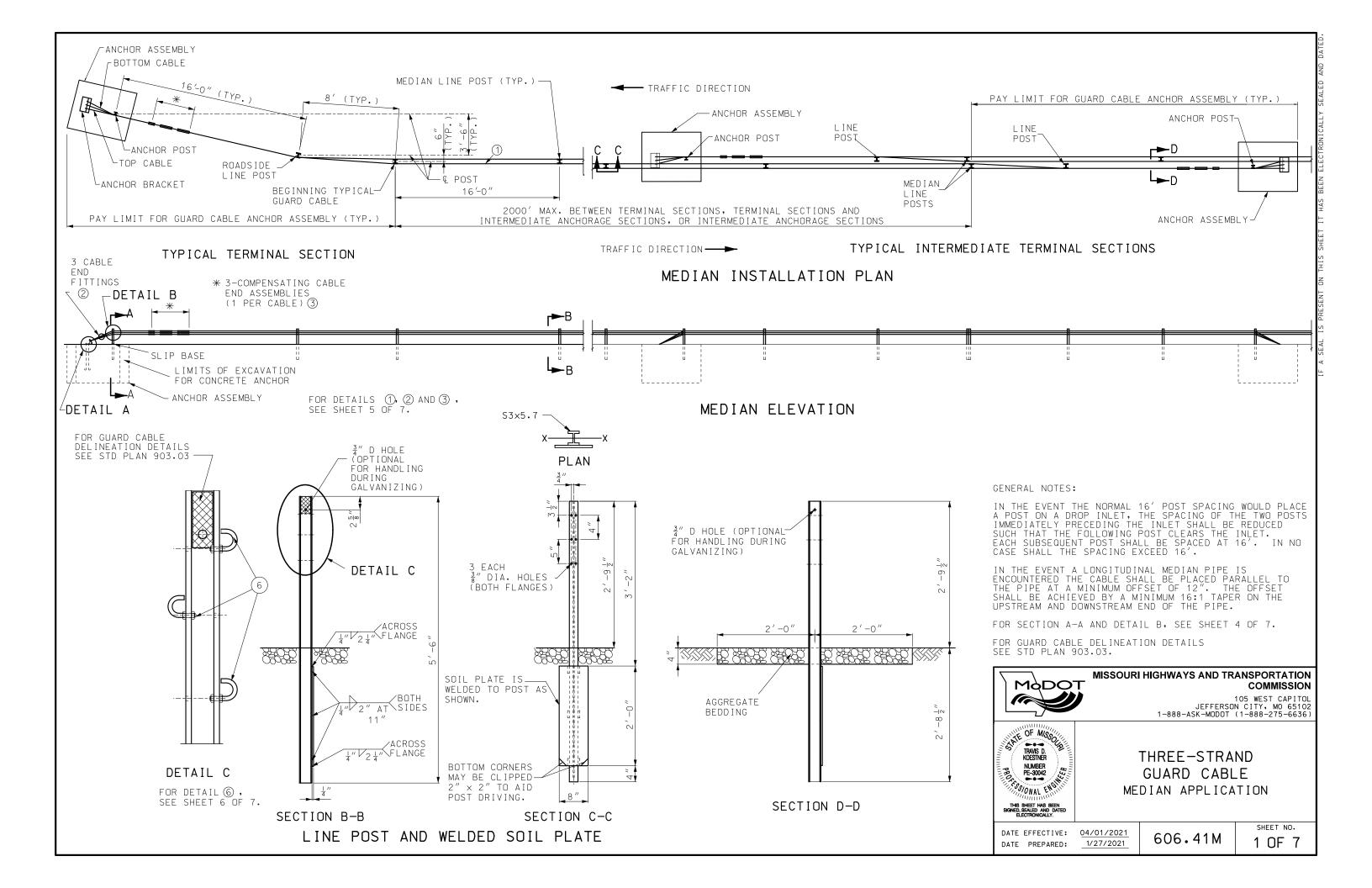
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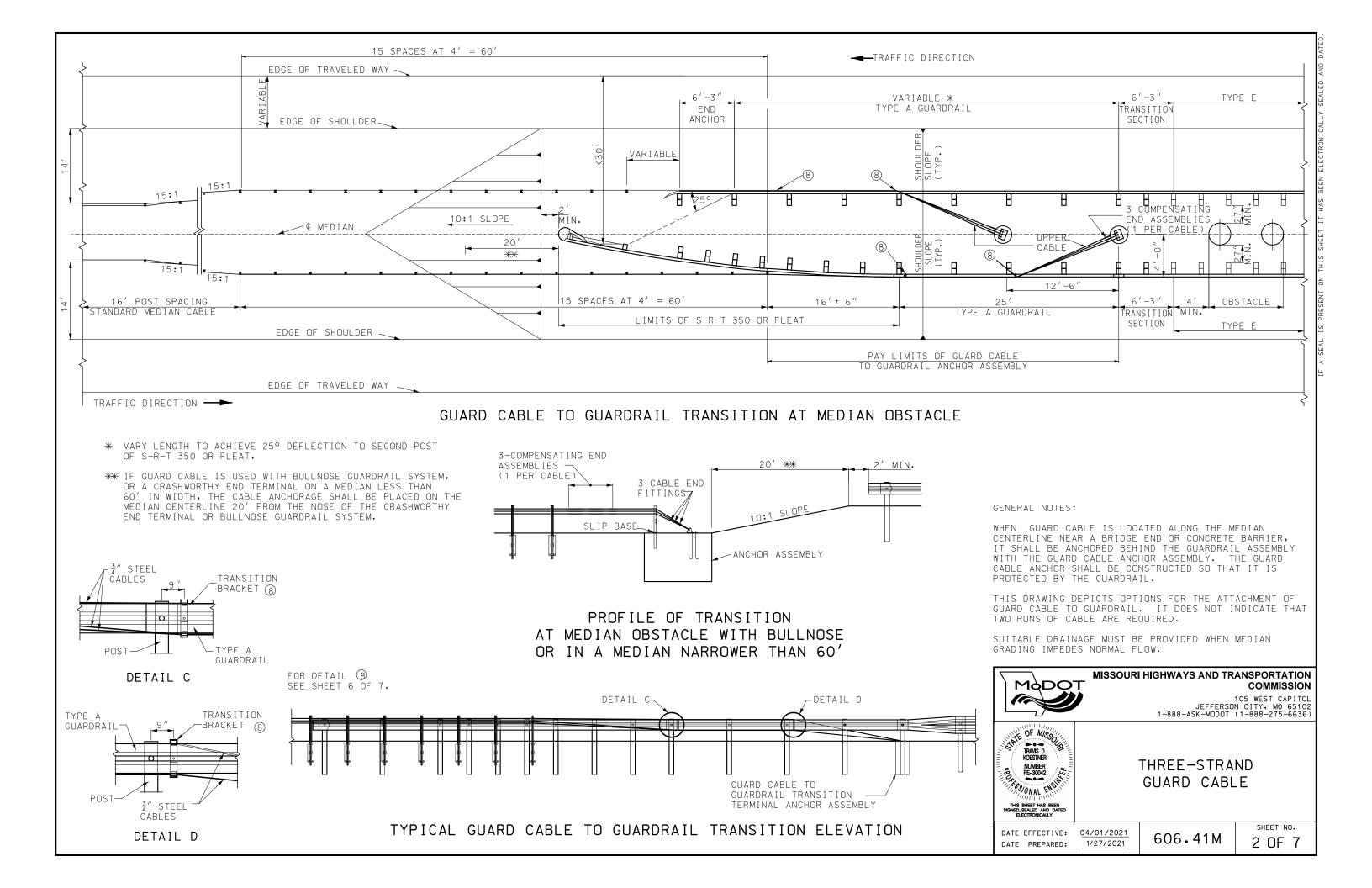
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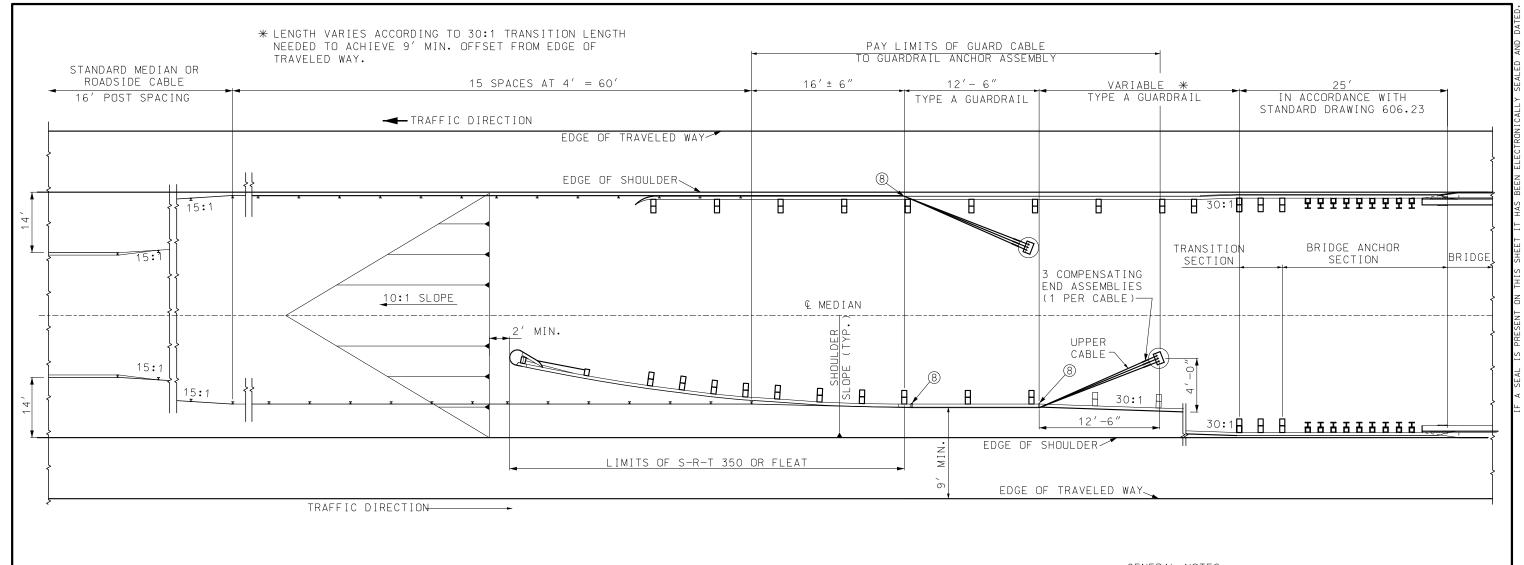
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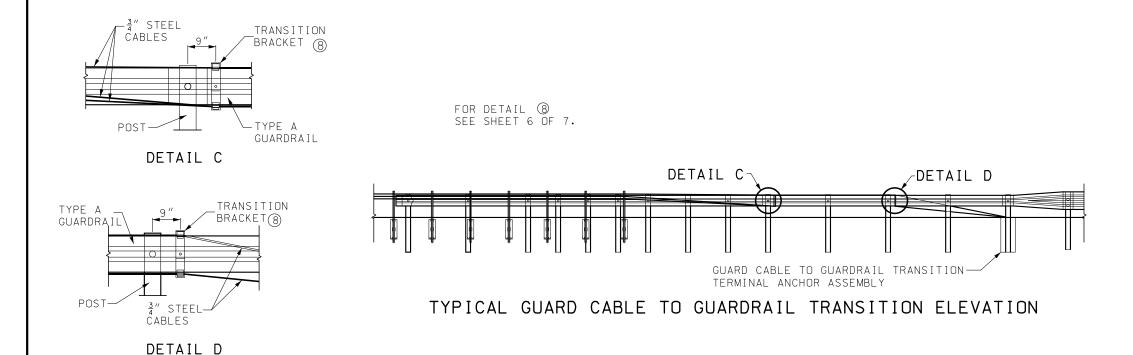
SHEET NO. 2 OF 2







# GUARD CABLE TO GUARDRAIL TRANSITION AT MEDIAN BRIDGE END

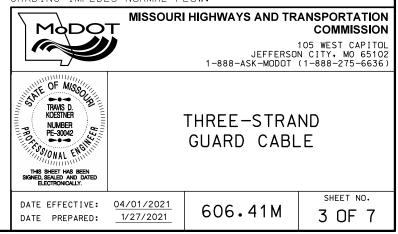


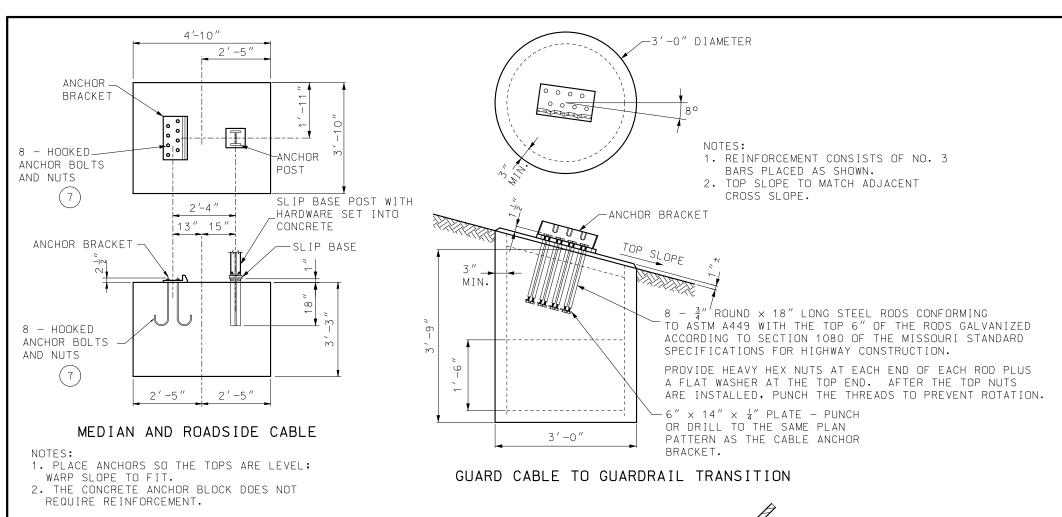
#### GENERAL NOTES:

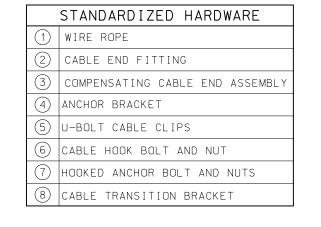
WHEN GUARD CABLE IS LOCATED ALONG THE MEDIAN CENTER-LINE NEAR A BRIDGE END OR CONCRETE BARRIER, IT SHALL BE ANCHORED BEHIND THE GUARDRAIL ASSEMBLY WITH THE GUARD CABLE ANCHOR ASSEMBLY. THE GUARD CABLE ANCHOR SHALL BE CONSTRUCTED SO THAT IT IS PROTECTED BY THE GUARDRAIL.

THIS DRAWING DEPICTS OPTIONS FOR THE ATTACHMENT OF GUARD CABLE TO GUARDRAIL. IT DOES NOT INDICATE THAT TWO RUNS OF CABLE ARE REQUIRED.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.







#### GENERAL NOTES:

FOR ARRANGEMENT OF SPRING AND COMPENSATING CABLE END ASSEMBLIES AND TURNBUCKLE CABLE END ASSEMBLIES, THE FOLLOWING CRITERIA SHALL APPLY: LENGTH OF CABLE RUNS TO 1000' - USE COMPENSATING CABLE END ASSEMBLY ON ONE END AND THE TURNBUCKLE CABLE END ASSEMBLY ON THE OTHER END OF EACH INDIVIDUAL CABLE, FOR LENGTHS LONGER THAN 1000' AND UP TO AND INCLUDING 2000' - USE COMPENSATING CABLE END ASSEMBLY ON EACH END OF THE INDIVIDUAL CABLE.

PRIOR TO FINAL ACCEPTANCE BY THE ENGINEER, THE FOLLOWING PROCEDURES SHALL BE USED TO TIGHTEN THE TURNBUCKLES. DEPENDING ON THE TEMPERATURE AT THE TIME OF THE ADJUSTMENT IN ACCORDANCE WITH THE FOLLOWING TABLE:

TEMPERATURE (°F)	SPRING COMPRESSION FROM UNLOADED POSITION IN EACH SPRING
120 TO 100	1 "
99 TO 80	1 ½"
79 TO 60	2 "
59 TO 40	2 <u>1</u> "
39 TO 20	3 "
19 TO 0	3 ½"
−1 TO −20	4 "
	120 TO 100 99 TO 80 79 TO 60 59 TO 40 39 TO 20 19 TO 0

THE SPECIFICATIONS AND DIMENSIONS OF ALL HARDWARE AND FITTINGS SHALL COMPLY WITH AASHTO-AGC-ARTBA JOINT COMMITTEE TASK FORCE 13 REPORT, A GUIDE TO STANDARD-17FD HIGHWAY BARRIER HARDWARE.



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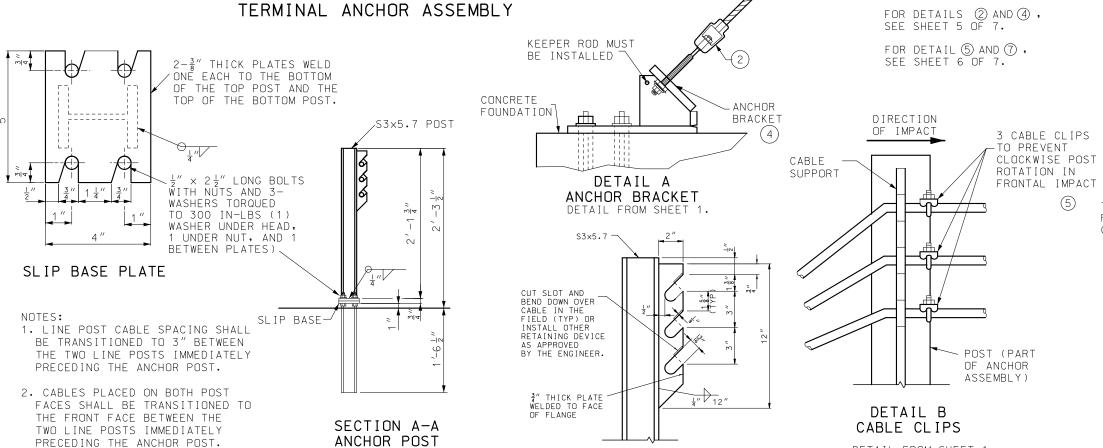
DETAIL FROM SHEET 1.

THREE-STRAND GUARD CABLE

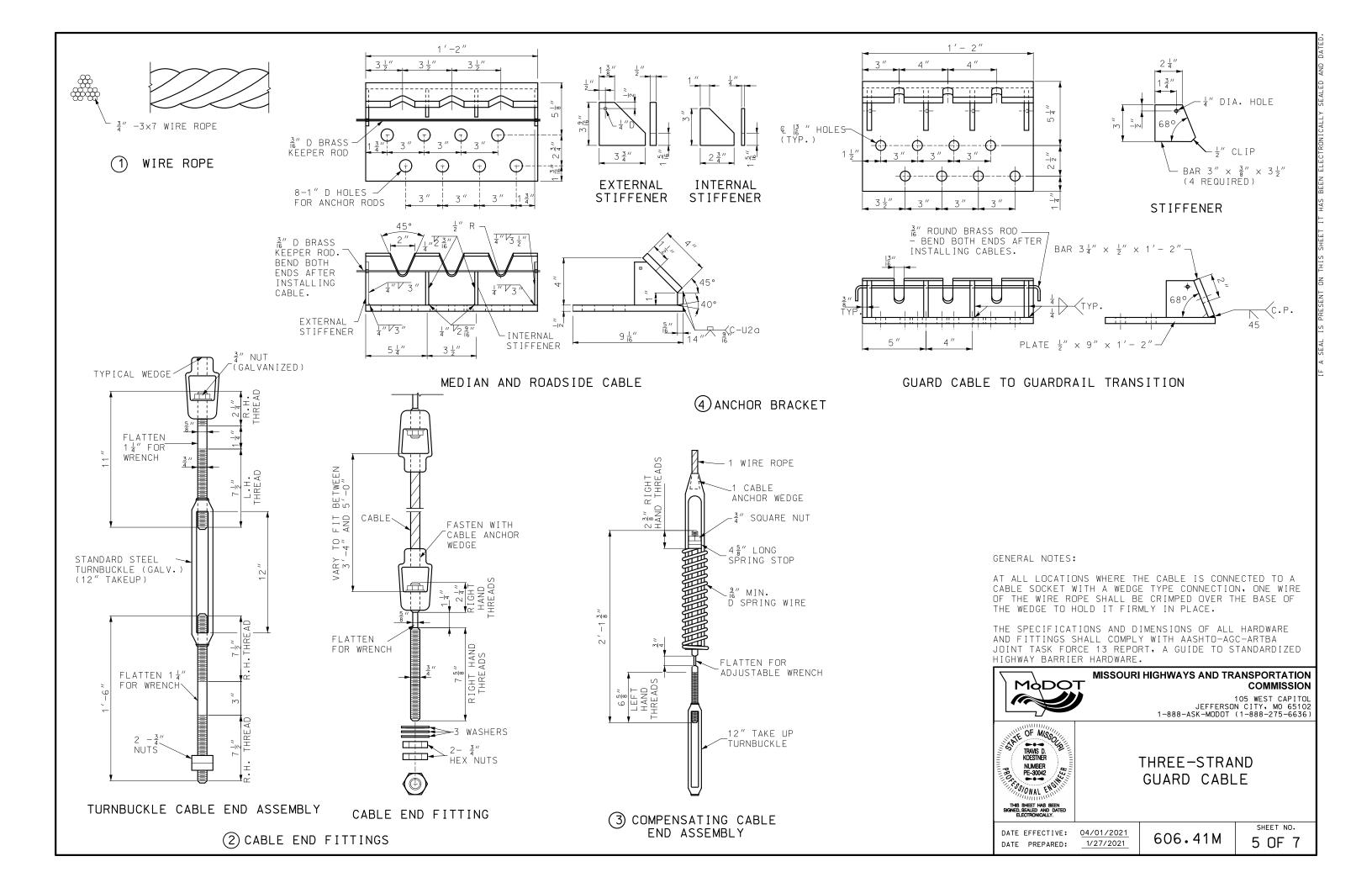
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DATE PREPARED: 1/27/2021

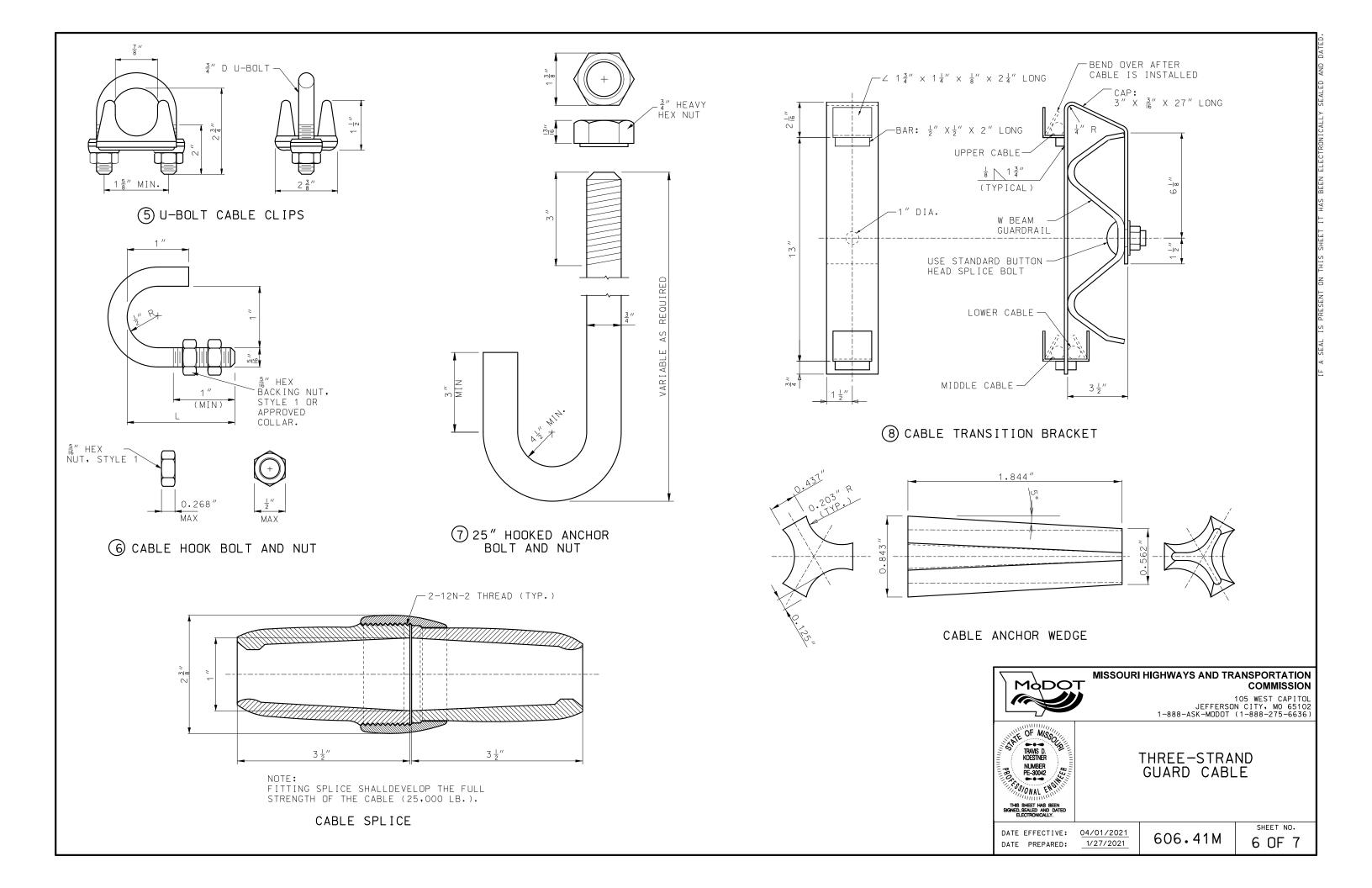
606.41M

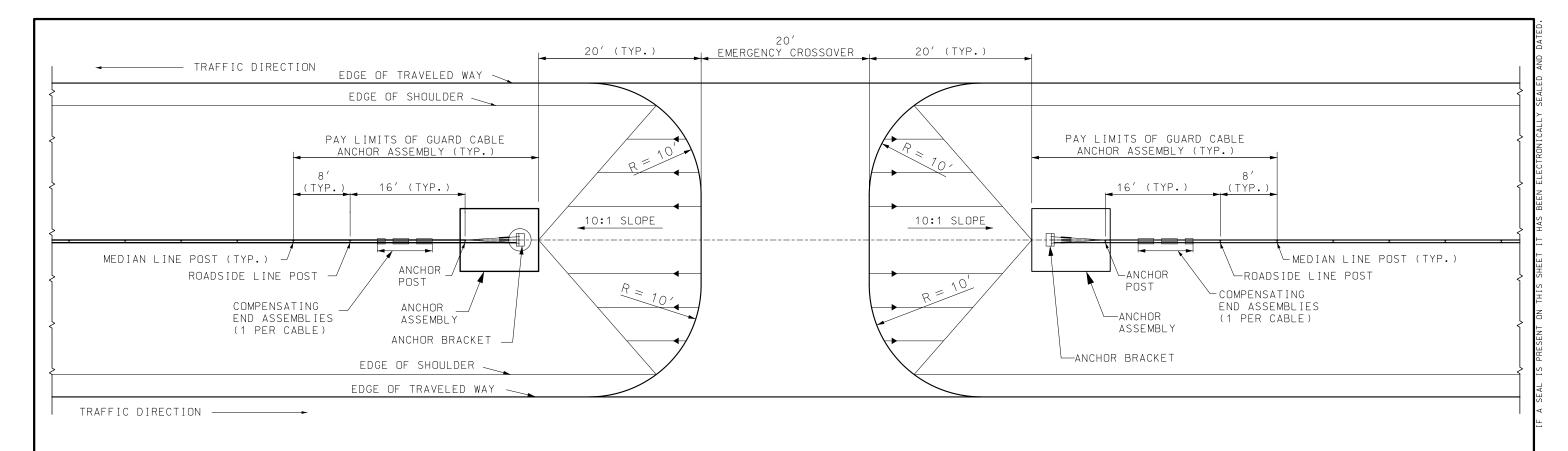
M 4 OF 7



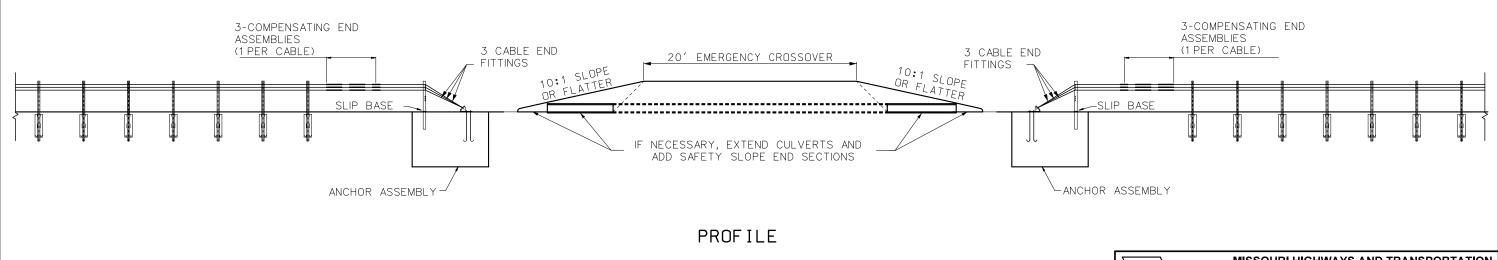
CABLE SUPPORT

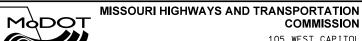






# PLAN





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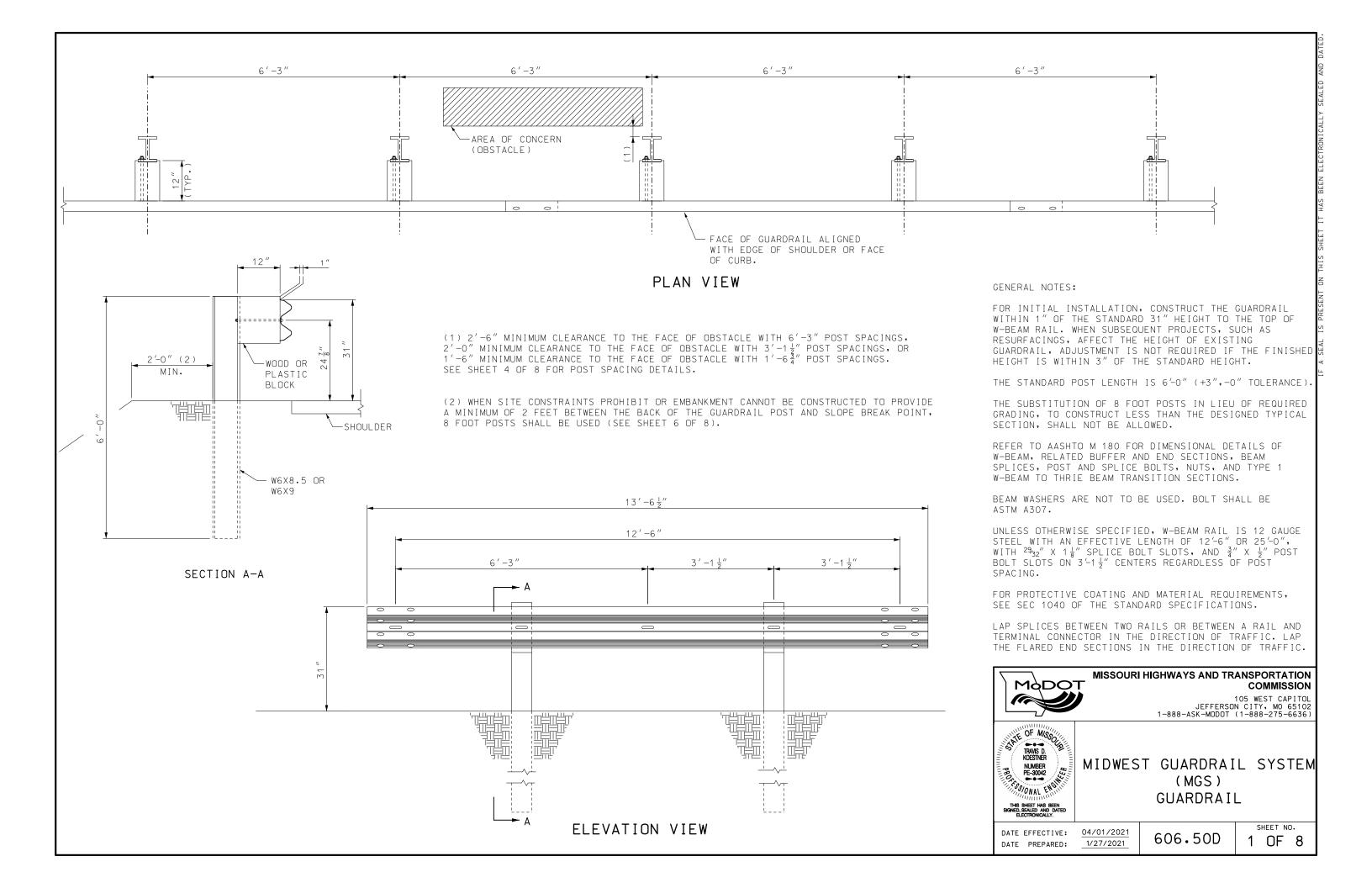
THREE-STRAND GUARD CABLE TRANSITION AT MEDIAN OPENING

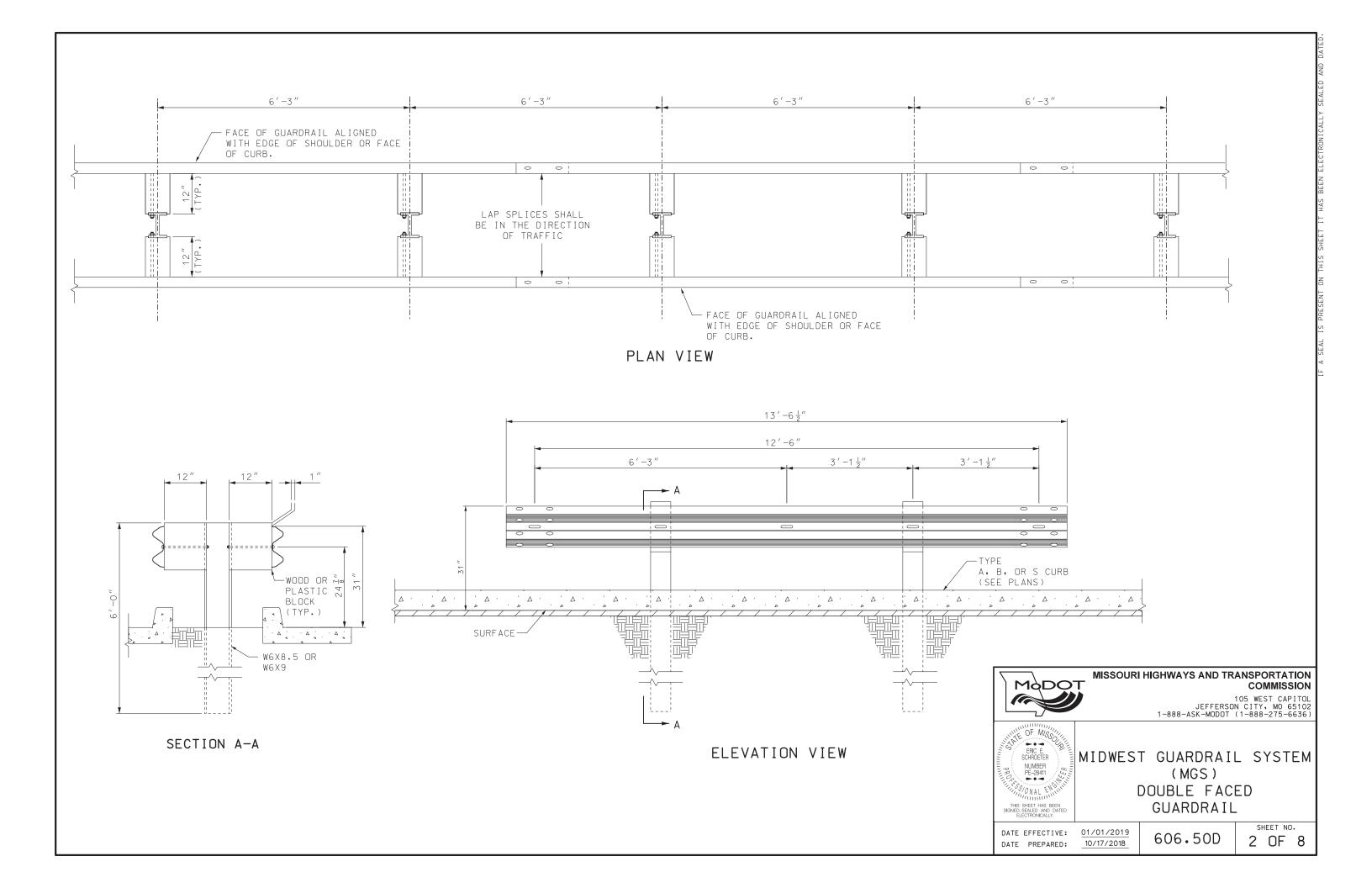
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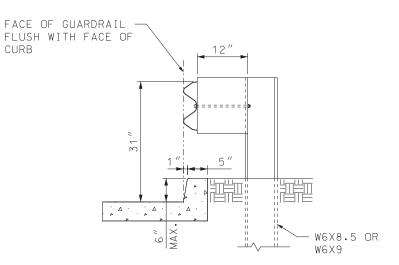
DATE EFFECTIVE: 04/01/2021 1/27/2021

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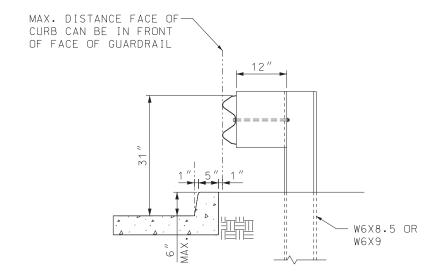
SHEET NO. 7 OF 7





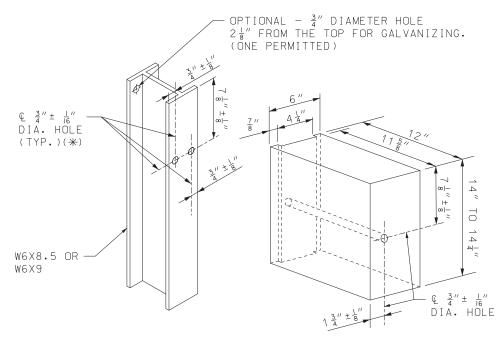


MGS GUARDRAIL AT CURB



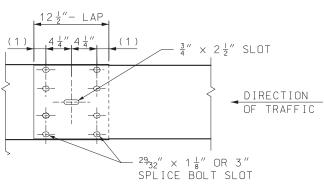
CURB

ALTERNATE MGS AT CURB



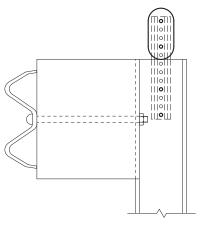
FOR STEEL POST AND NOTCHED WOOD OR PLASTIC BLOCK HOLE PUNCHING DETAIL

(\*) TWO HOLES CAN BE PROVIDED ON EACH FLANGE OF POST, ONLY ONE IS REQUIRED FOR FLANGE OF POST THAT HAS A BLOCK ATTACHMENT.



(1) 2" (TOLERANCE  $+1\frac{1}{4}$ ",  $-\frac{1}{4}$ ")

RAIL ELEMENT SPLICE DETAIL



DELINEATORS ON GUARDRAIL

GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE STD PLAN 903.03.



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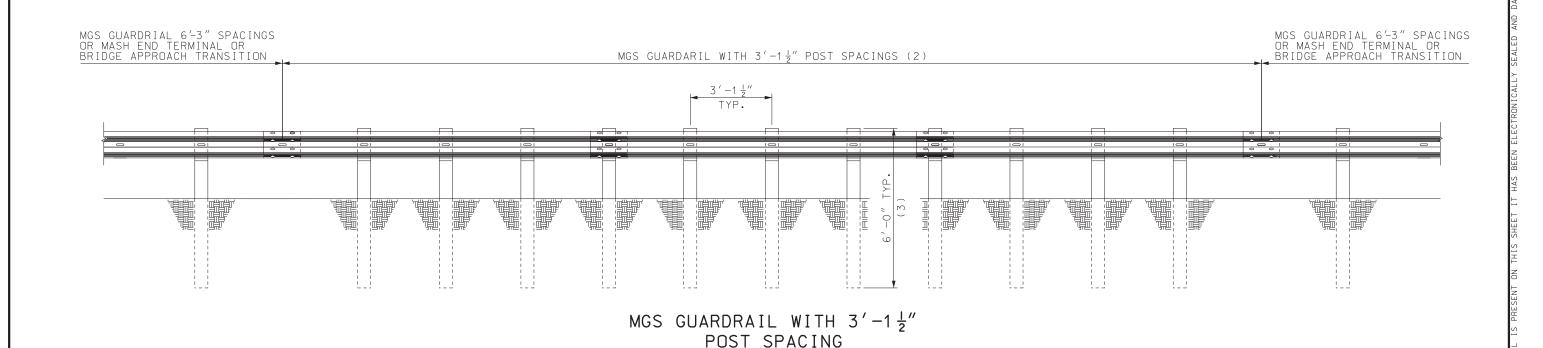
MIDWEST GUARDRAIL SYSTEM (MGS) POST AND BLOCK

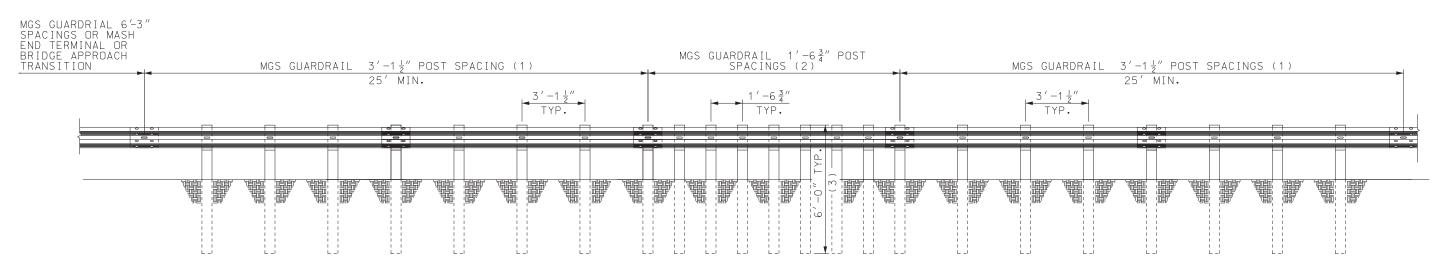
DATE EFFECTIVE: 01/01/2019 DATE PREPARED:

10/17/2018

606.50D

SHEET NO. 3 OF 8





MGS GUARDRAIL WITH  $1'-6\frac{3}{4}"$ POST SPACING

- (1) 25 FEET OF MGS 3'-1 $\frac{1}{2}$ " POST SPACING GUARDRAIL IS REQIRED ON APPROACH AND DEPARTURE ENDS OF  $1'-6\frac{3}{4}''$  POST SPACING MGS GUARDRAIL.
- (2) USE AS MANY SEGMENTS AS NECESSARY TO SHIELD THE AREA OF CONCERN.
- (3) REDUCED POST SPACING SHALL USE 6'-0" POSTS MAX. ANY DEVIATION OF 6'-0" POSTS WILL ONLY BE ALLOWED IN ACCORDANCE WITH SPECIAL INSTALLATIONS AS SHOWN ON SHEET 5 OF 8.

#### GENERAL NOTES:

- 8' POSTS CANNOT BE USED WHEN:
- POST SPACING IS LESS THAN 6'-3"
- WITHIN CRASHWORTHY END TERMINALS (SEE MANUFACTURERS DRAWINGS)
- WITHIN VERTICAL BARRIER TRANSITIONS (606.60)
- WITHIN BRIDGE APPROACH TRANSITIONS (606.70)



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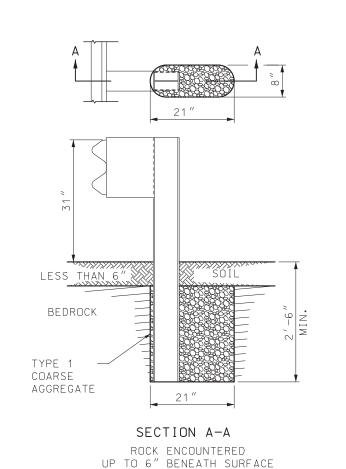
MIDWEST GUARDRAIL SYSTEM (MGS) REDUCED POST SPACINGS

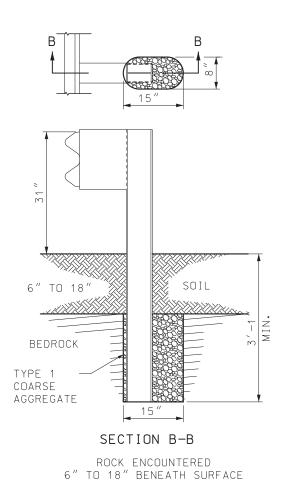
DATE EFFECTIVE: 01/01/2019 DATE PREPARED:

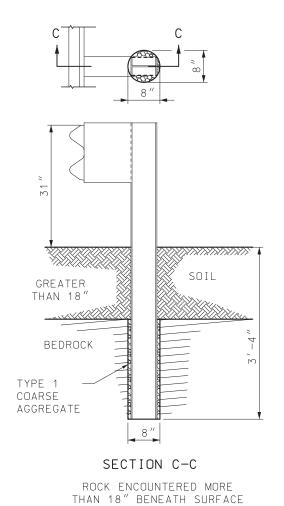
10/17/2018

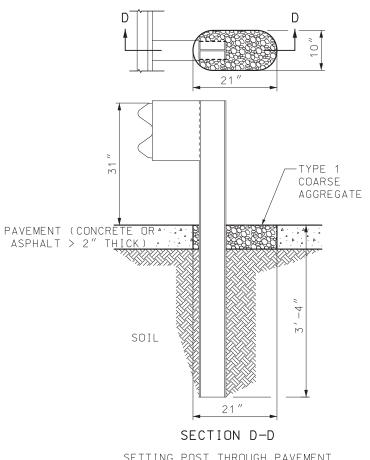
606.50D

SHEET NO. 4 OF 8



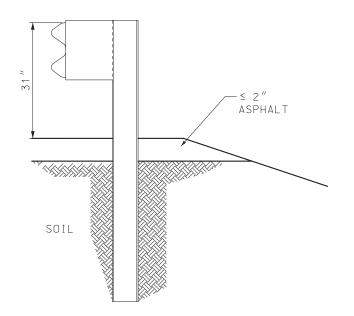






SETTING POST THROUGH PAVEMENT (CONCRETE OR ASPHALT > 2" THICK)

# SETTING POST IN SOLID ROCK



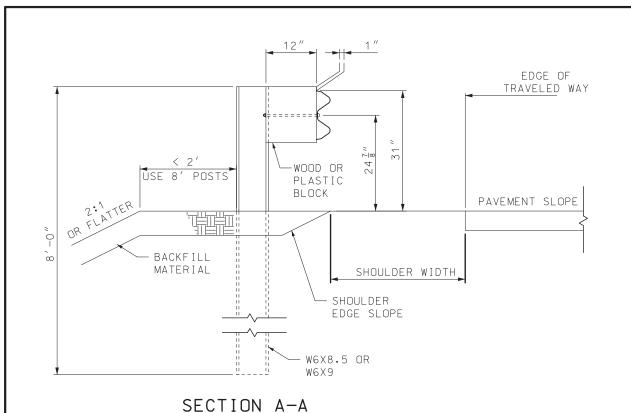
SETTING POST THROUGH ASPHALT ≤ 2" THICK

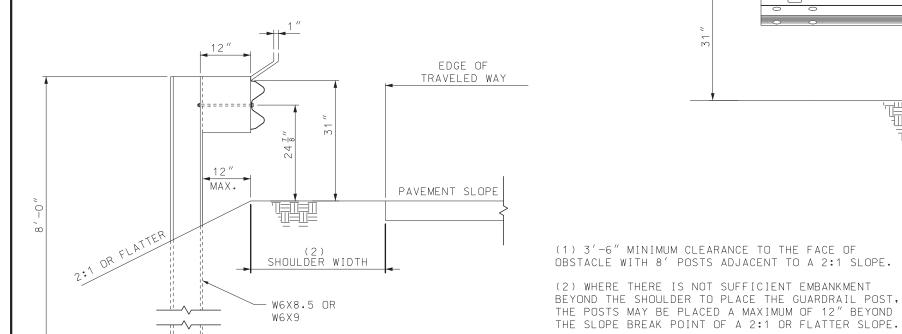
#### GENERAL NOTES:

HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF THE STANDARD SPECIFICATIONS.







GENERAL NOTES:

TERMINALS.

SEE STD. PLAN 606.81 FOR SITE GRADING REQUIREMENTS FOR CRASHWORTHY END

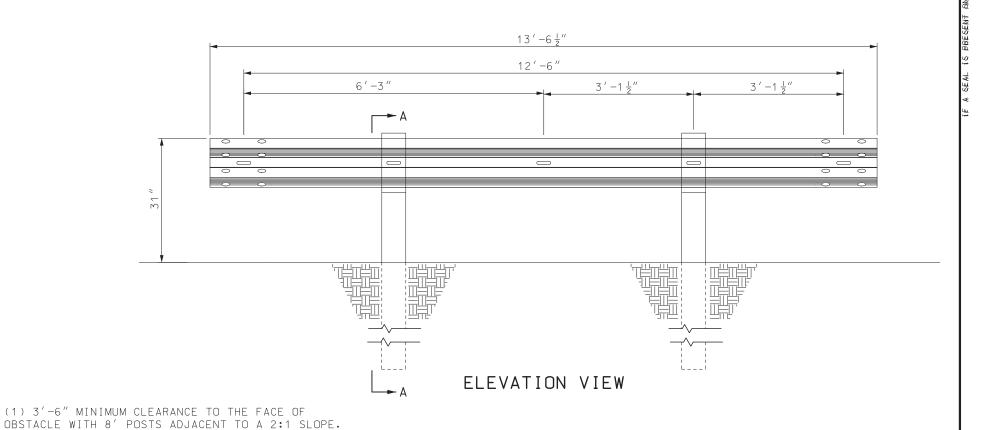
BETWEEN THE BACK OF THE GUARDRAIL POST AND THE SLOPE BREAK POINT. THE SUBSTITUTION OF 8 FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT

LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.

8 FOOT POSTS SHALL BE USED WHEN LESS THAN 2 FEET OF EMBANKMENT IS PRESENT

8' STEEL POST

ALTERNATE SECTION A-A
MAXIMUM LATERAL PLACEMENT OF
8' STEEL POSTS ADJACENT TO
SLOPES



PLAN VIEW

- SLOPE HINGE

0

MODOT

ERIC E. SCHROETER

SONAL ENG

DATE PREPARED:

DATE EFFECTIVE: 01/01/2019

10/17/2018

0 |

-USE 8' POSTS

MISSOURI HIGHWAYS AND TRANSPORTATION

MIDWEST GUARDRAIL SYSTEM

(MGS)

8 FT. POST

606.50D

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

COMMISSION

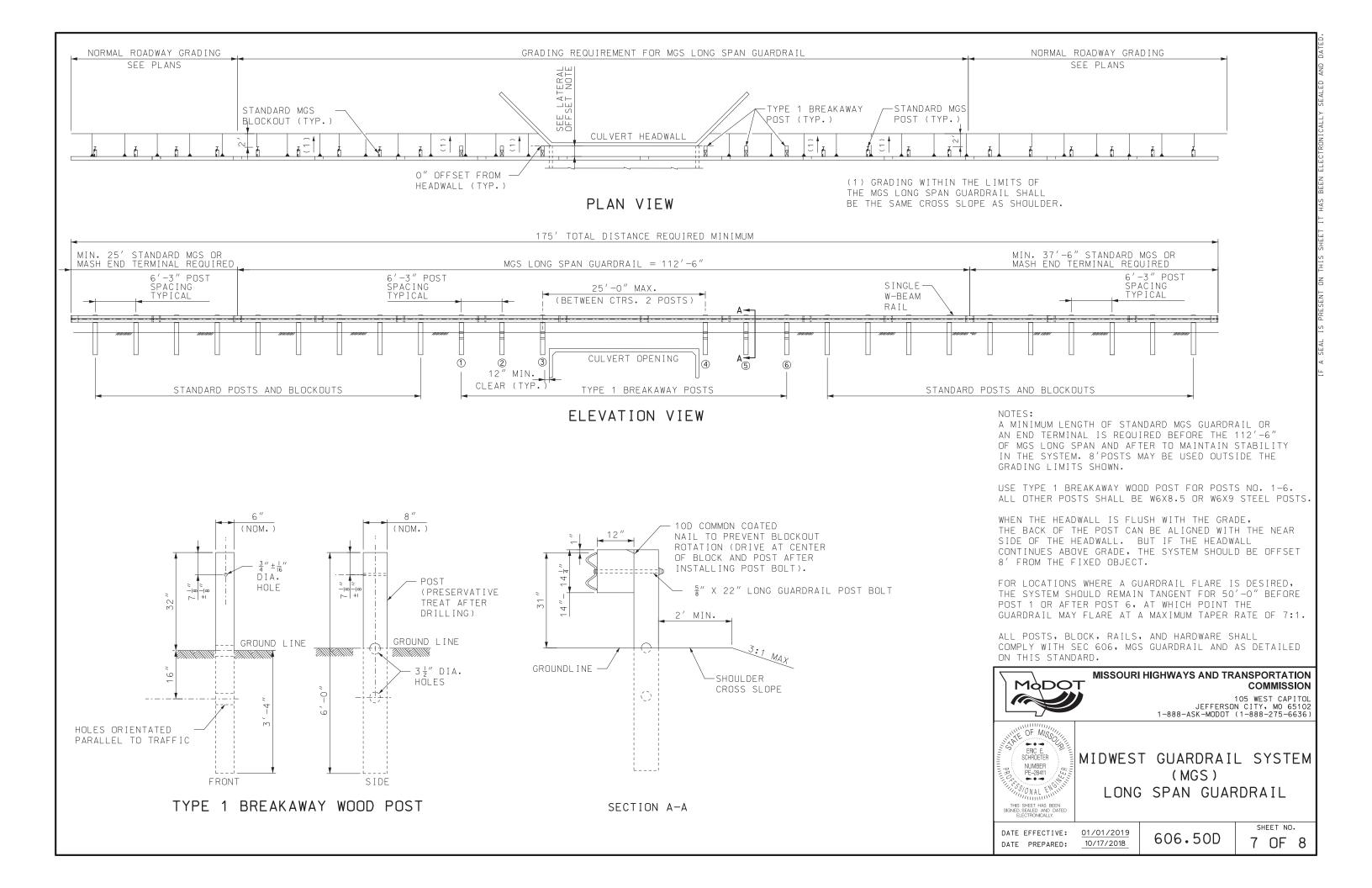
SHEET NO.

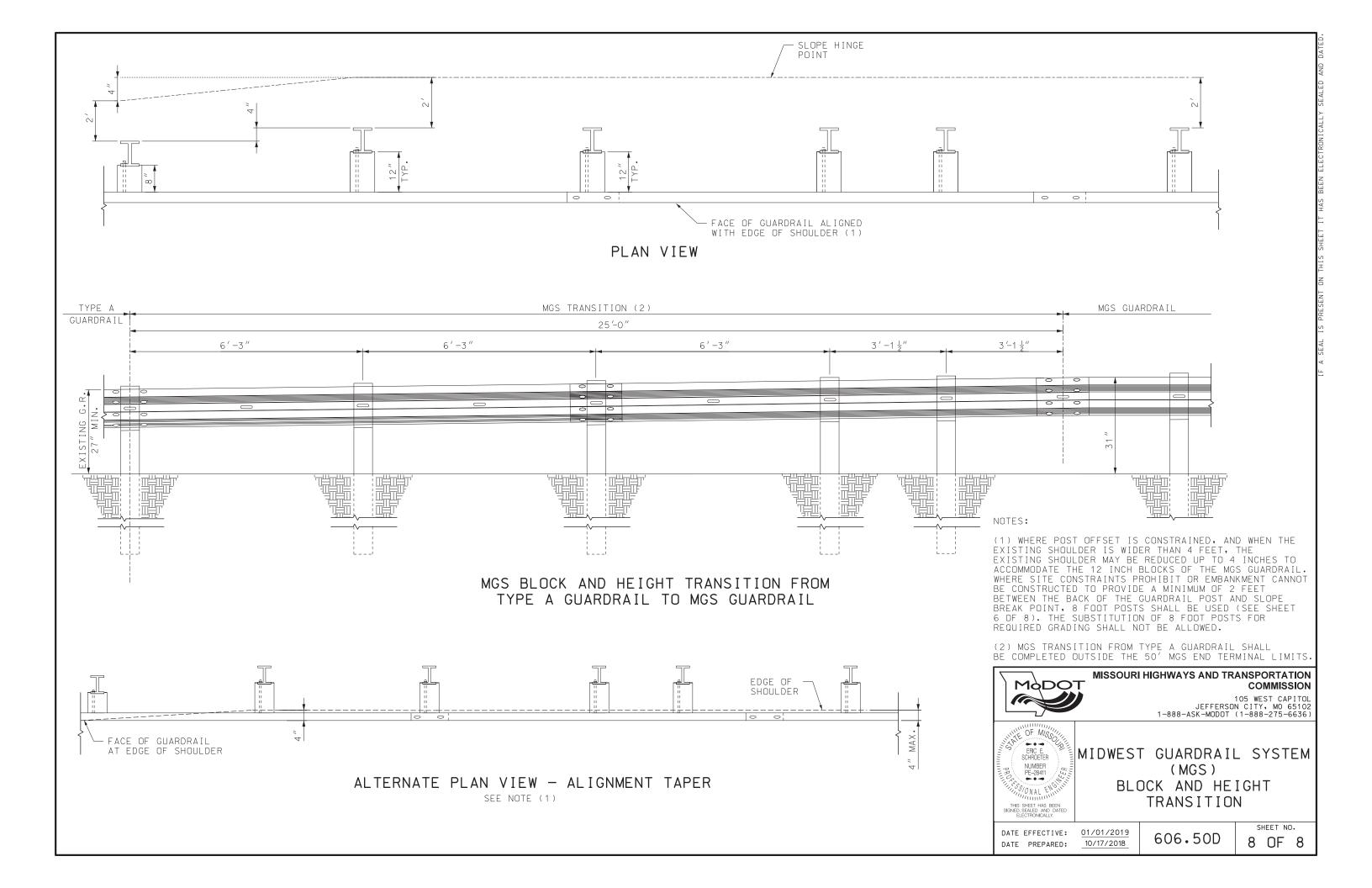
6 OF 8

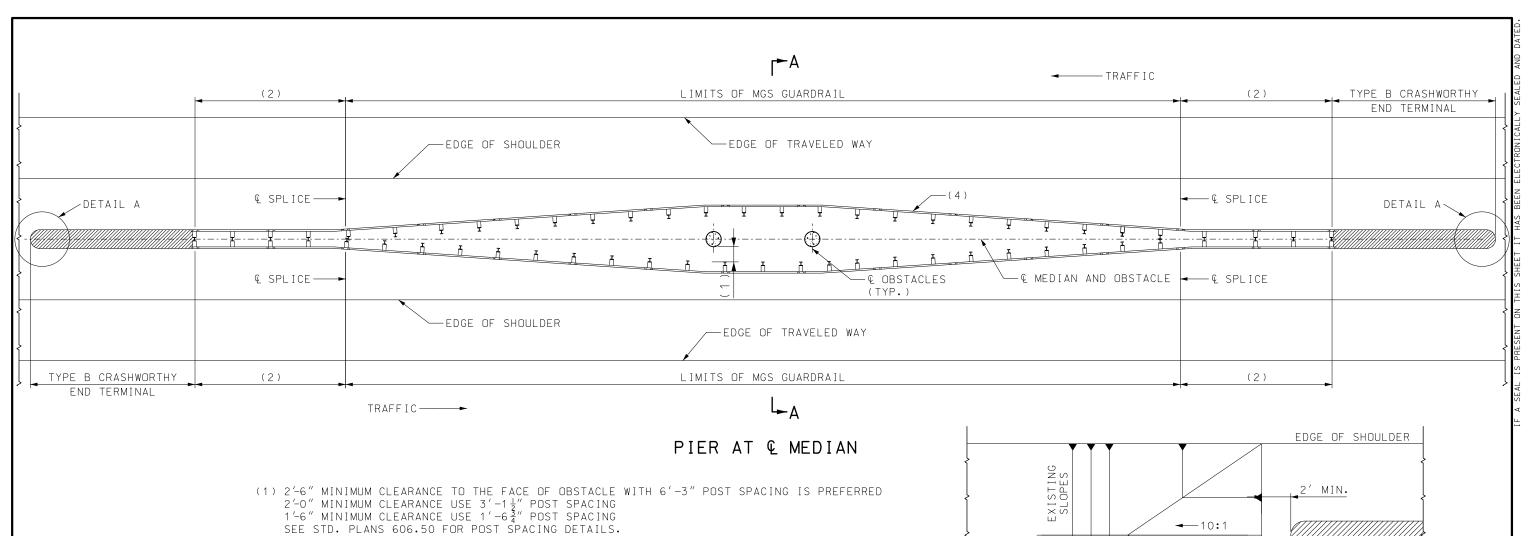
POINT

-AREA OF CONCERN

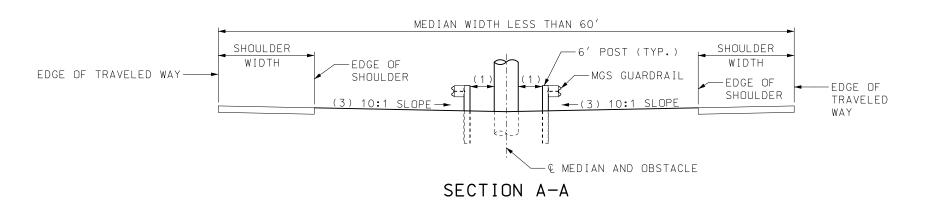
(OBSTACLE)

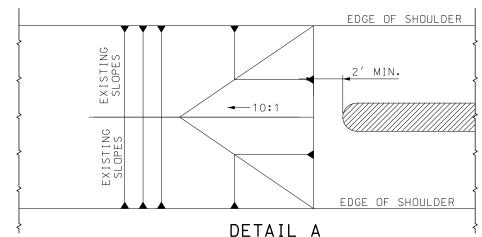






- (2) TRANSITION DOUBLE FACED GUARDRAIL HEIGHT AND WIDTH IF NEEDED FOR TYPE B CRASHWORTHY END TERMINAL PER MANUFACTURE'S REQUIREMENTS, SEE STD, PLANS 606.50 FOR HEIGHT TRANSITION DETAILS.
- (3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.
- (4) 15:1 FLARE RATE OR AS RECOMMENDED BY TABLE 5-9 OF THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE".





GENERAL NOTE:

(GRADING LIMITS)

TYPE B CRASHWORTHY END TERMINAL SHALL BE MGS COMPATIBLE, LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# MGS GUARDRAIL MEDIAN PIER PROTECTION

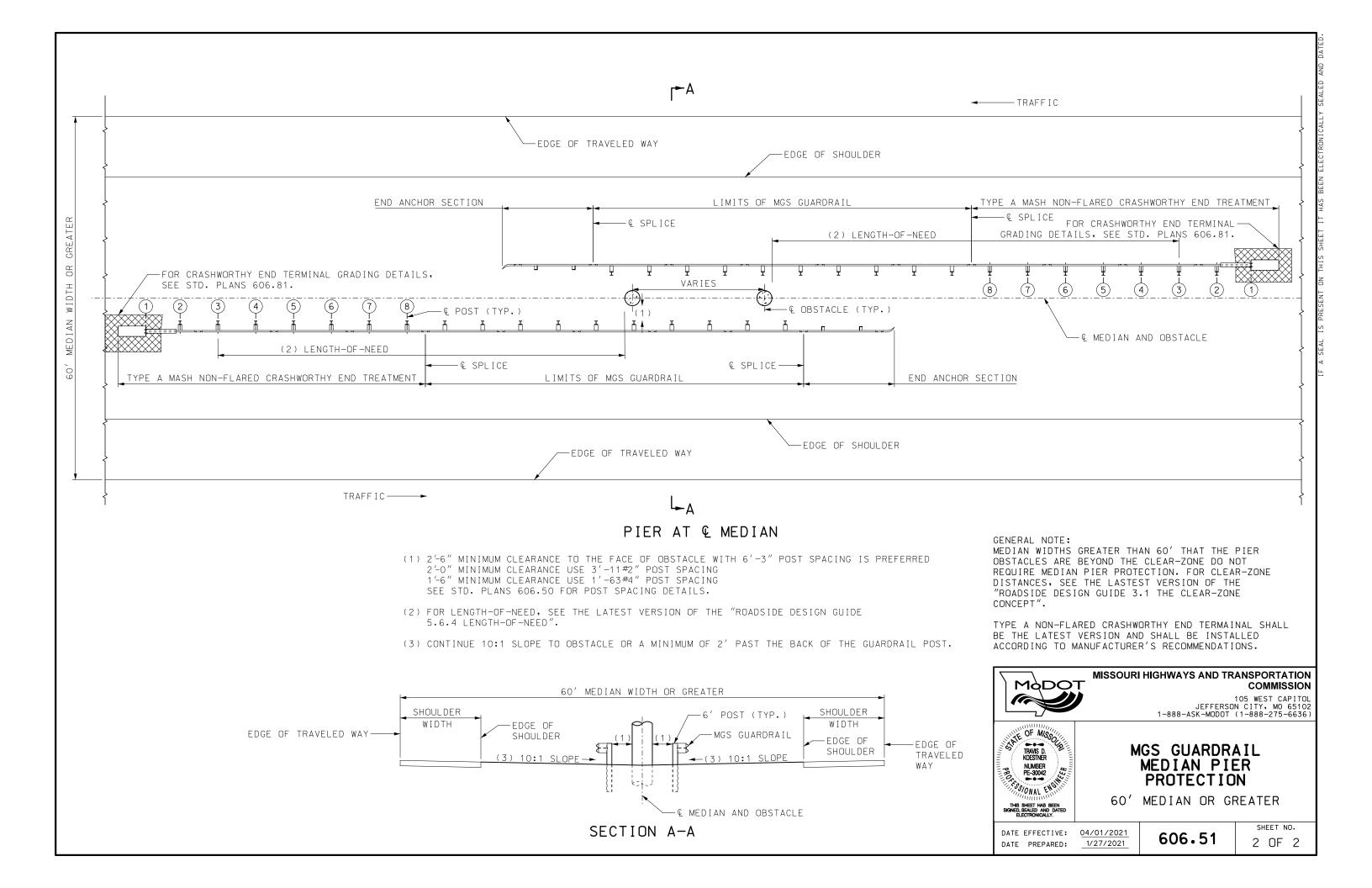
MEDIAN LESS THAN 60'

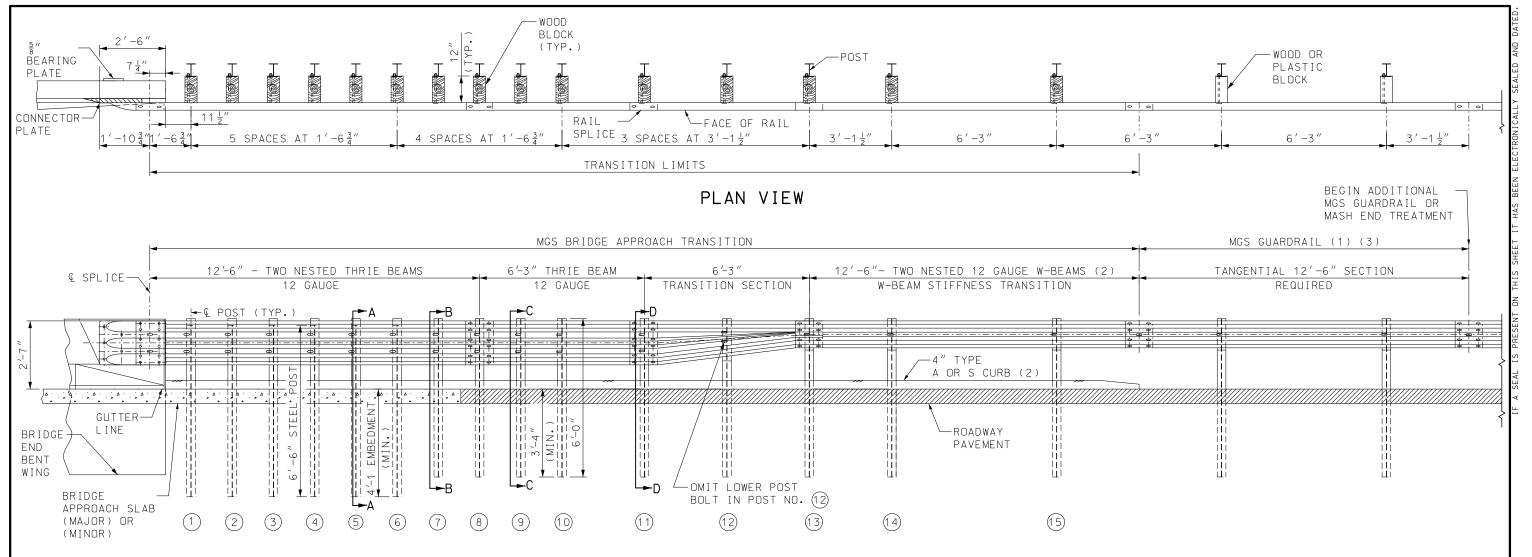
DATE EFFECTIVE: 04/01/2021 DATE PREPARED:

1/27/2021

606.51

SHEET NO. 1 OF 2





GENERAL NOTES:

MGS GUARDRAIL SHALL BE TANGENTIAL WITH BRIDGE APPROACH TRANSITION FOR 12'-6" BEYOND THE TWO NESTED W-BEAM STIFFNESS TRANSITION AND 25'-0" BEYOND THRIE BEAM TRANSITION SECTION.

AT THE CONTRACTORS OPTION, A SINGLE 18'-9" PIECE OF THRIE BEAM MAY BE SUBSTITUTED FOR ONE OF THE 12'-6" PANELS AND THE 6'-3" SECTION AS SHOWN.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE  $\frac{5}{8}''$  BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS =  $\frac{3}{8}''$  MIN.).

THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

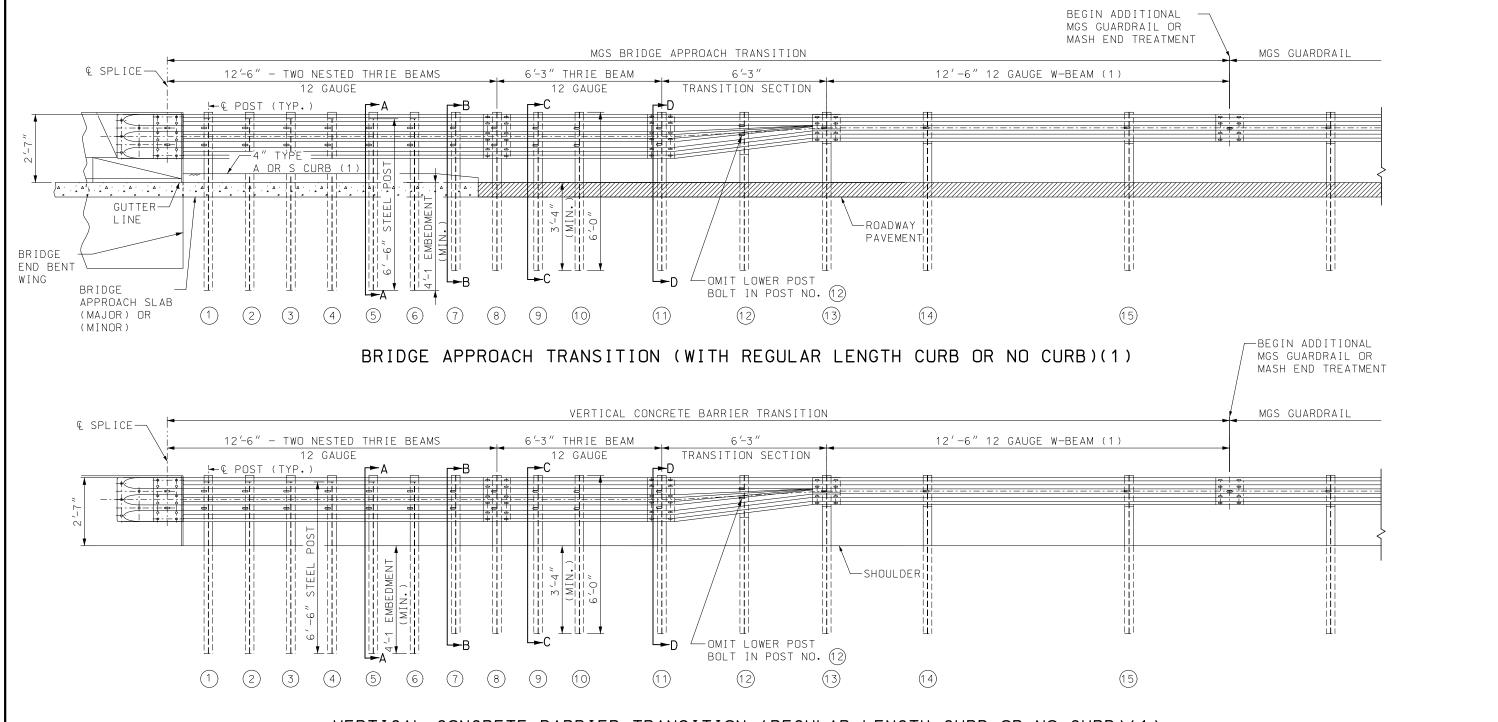
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (EXTENDED CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

# BRIDGE APPROACH TRANSITION (EXTENDED CURB)(2)

THE CONTRACTOR MAY, AT THEIR OPTION, FURNISH EQUIVALENT SECTIONS
FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE
REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BEGALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS
OF AASHTO M 111.

- (1) PLACE THE FIRST POST OF THE MGS 6'-3" PAST THE LAST POST OF THE BRIDGE APPROACH TRANSITION TO KEEP POSTS OFFSET FROM THE RAIL SPLICES.
- (2) WHERE CURB EXTENDS UPSTREAM OF POST NO. (1) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (3)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. WHEN CURBS DO NOT EXTEND UPSTREAM OF POST NO. (1), PAY FOR A BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB). FOR DETAILS OF BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB), SEE SHEET 2 OF 6.
- (3) THE ADDITIONAL REQUIRED MGS GUARDRAIL IS INCLUDED IN THE TOTAL LENGTH OF NEED AND SHALL BE PAID FOR AS A GUARDRAIL PAY ITEM.





# VERTICAL CONCRETE BARRIER TRANSITION (REGULAR LENGTH CURB OR NO CURB)(1)

(VIEW SHOWN WITHOUT CURB)

GENERAL NOTES: SEE SHEET 1 FOR ADDITIONAL NOTES NOT INCLUDED ON THIS SHEET.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (REGULAR/NO CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. (1) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (3)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. IF CURB EXTENDS BEYOND POST NO. (1), PAY FOR A BRIDGE APPROACH TRANSITION (EXTENDED CURB).



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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MIDWEST GUARDRAIL SYSTEM (MGS)

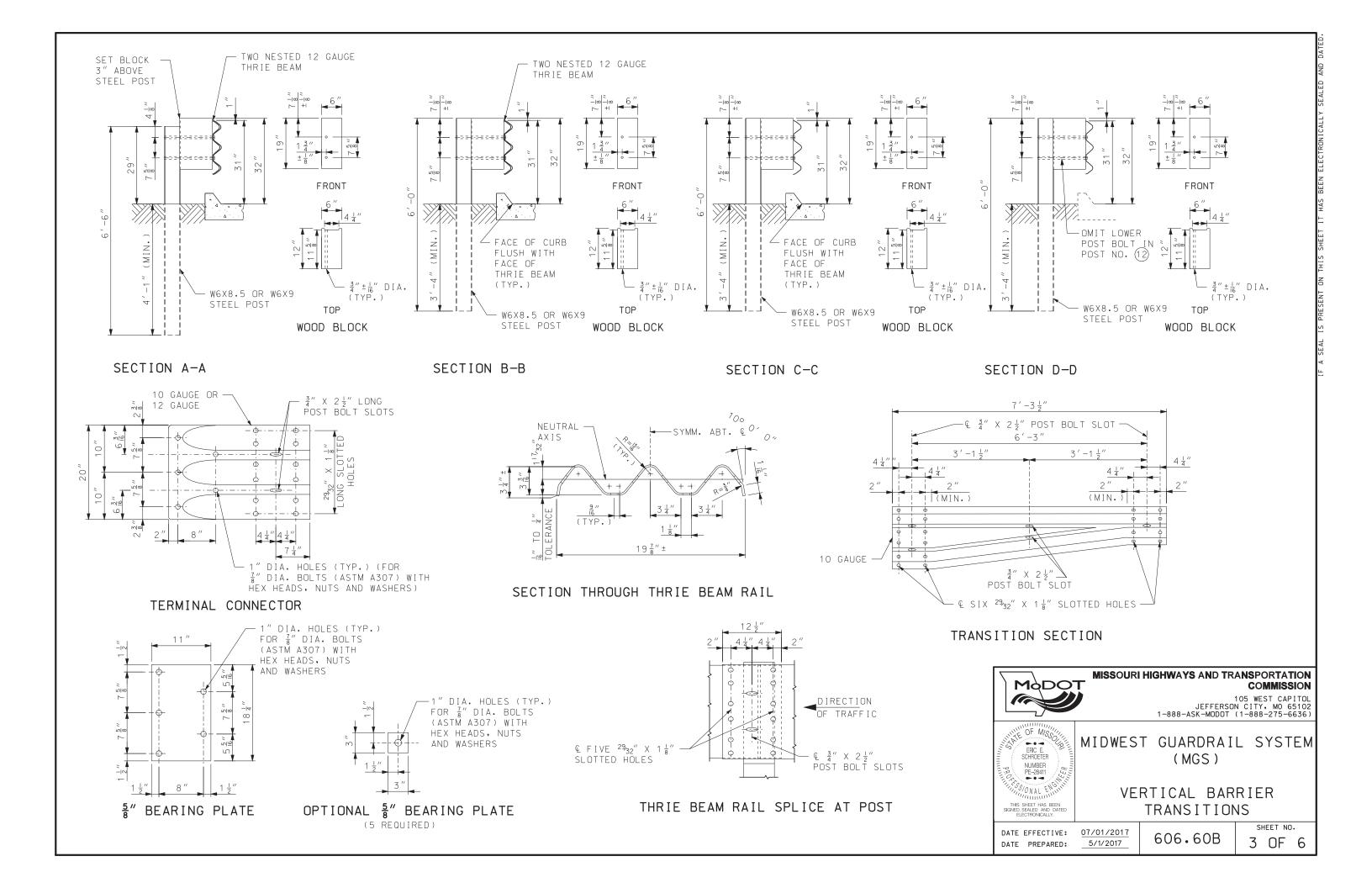
VERTICAL BARRIER

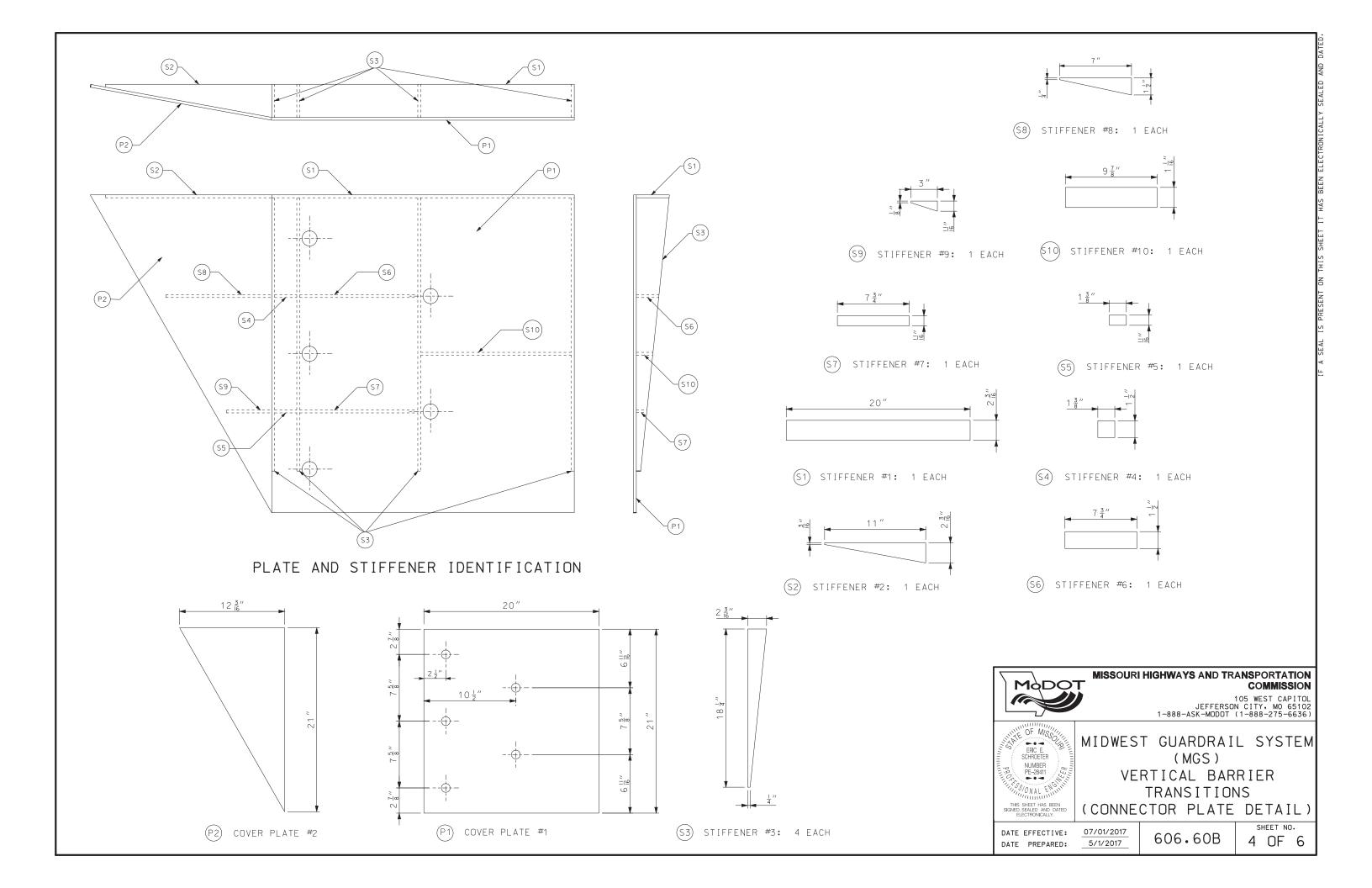
TRANSITIONS

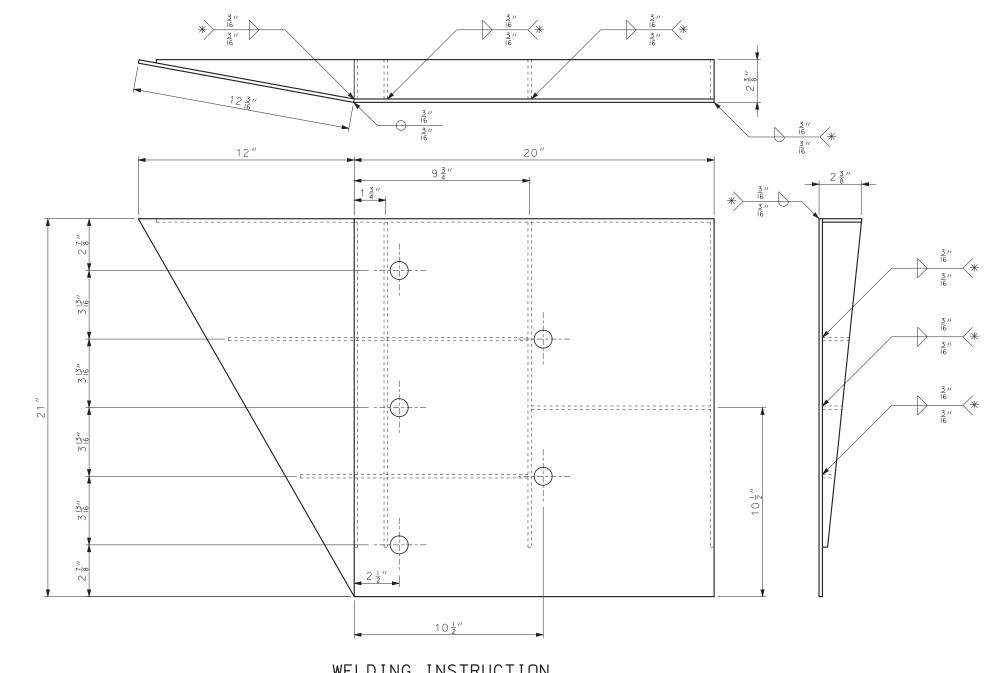
DATE EFFECTIVE: DATE PREPARED:

07/01/2021 5/5/2021 606.60B

SHEET NO. 2 OF 6







# WELDING INSTRUCTION

\* ALL FILLET WELDS SHALL BE 1" LONG SPACED AT 2".

GENERAL NOTES:

COVER PLATE PANELS ARE 16" THICK.

ALL STIFFENERS ARE 4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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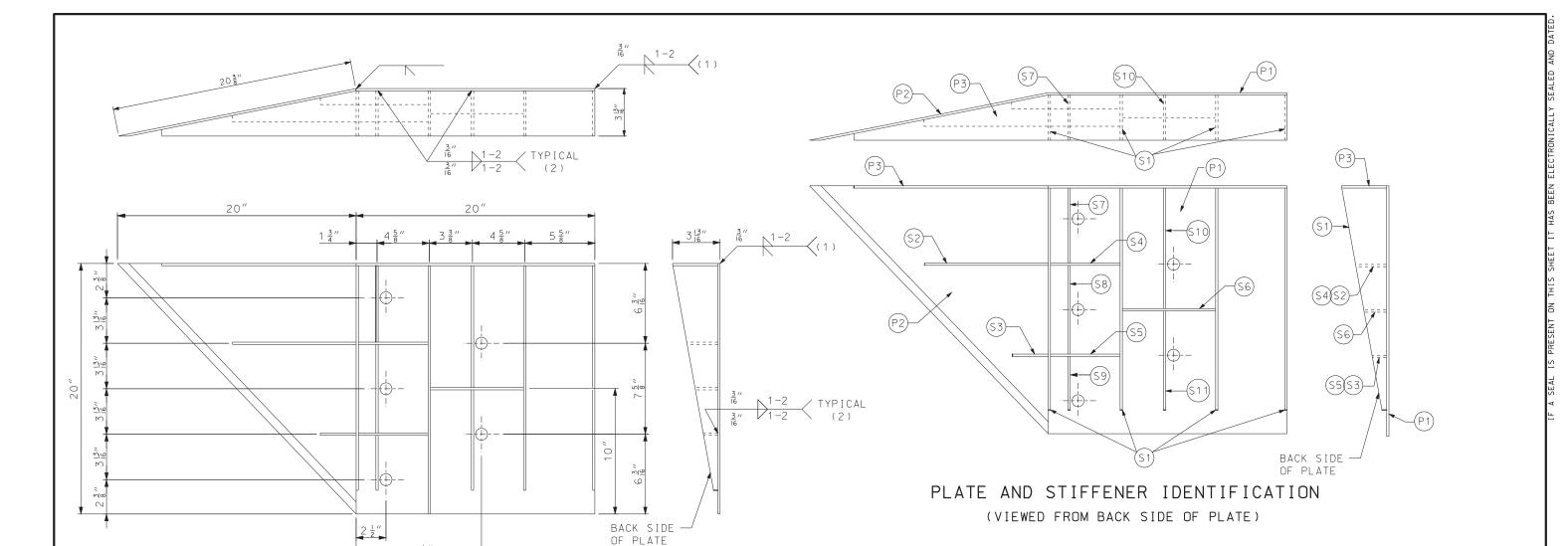
MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS

(CONNECTOR PLATE DETAIL)

DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

606.60B

SHEET NO. 5 OF 6



# WELDING INSTRUCTION (VIEWED FROM BACK SIDE OF PLATE)

 $10\frac{1}{2}''$ 

- (1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS: SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND  $\frac{3}{16}''$ FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS: 3/6" FILLET WELD BY 1" LONG SPACED AT 2".

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A $\times$ B $\times$ C $\times$ D)	THICKNESS
P1	1	B A	20" × 20"	<u>3</u> //
P2	1	B C	20" × 20" × 28 <sup>9</sup> / <sub>16</sub> "	<u>3</u> //
Р3	1	BACD	$39" \times 3\frac{5}{8}" \times 20" \times 19\frac{5}{16}"$	<u>3</u> //
S1	4	B CD	$18\frac{7}{16}$ " × $3\frac{5}{8}$ " × $18\frac{3}{4}$ "	<u>                                     </u>
S2	1	B C D	$10\frac{1}{4}$ " × $2\frac{7}{16}$ " × $10\frac{3}{8}$ " × $\frac{1}{2}$ "	1/4
S3	1	вфр	$3'' \times 1\frac{1}{16}'' \times 3\frac{1}{8}'' \times \frac{1}{2}''$	1/4
S4	1	вЁ	6 ½" × 2 ½"	<u> </u> ''
S5	1	вЁ	6 ½" × 1 ½"	<u> </u> ''
S6	1	вД	$7\frac{3}{4}'' \times 1\frac{3}{4}''$	<u>  1</u> ''
S7	1	AB C	$2\frac{9}{16}$ " × 6" × $3\frac{5}{8}$ " × $5\frac{7}{8}$ "	1/4
S8	1	AB C	$1^{5}_{32}$ " × $7\frac{1}{2}$ " × $2\frac{1}{2}$ " × $7\frac{3}{8}$ "	<u> </u> ''
S 9	1	C B	$6\frac{1}{16}$ " × $6\frac{3}{16}$ " × $1\frac{3}{32}$ "	1/4
S10	1	ABC	$1\frac{7}{8}$ " × $9\frac{7}{8}$ " × $3\frac{5}{8}$ " × $9\frac{11}{16}$ "	1/4
S11	1	c BD	$8\frac{1}{2}$ " $\times$ $8\frac{3}{4}$ " $\times$ $1\frac{13}{16}$ "	1/4

GENERAL NOTES:

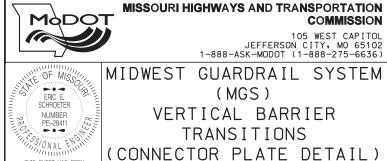
COVER PLATE PANELS ARE 3" THICK.

ALL STIFFENERS ARE 4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

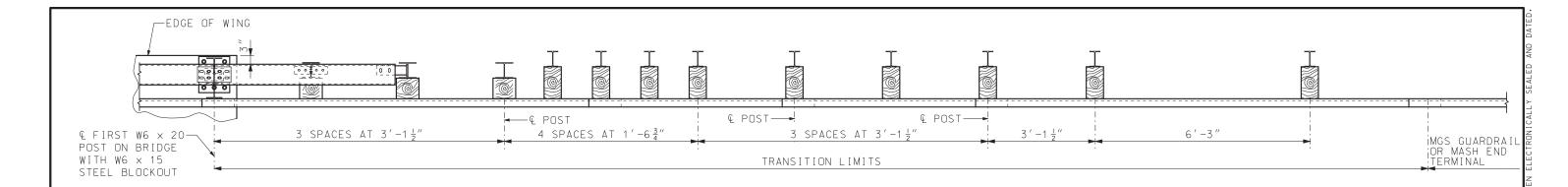


DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

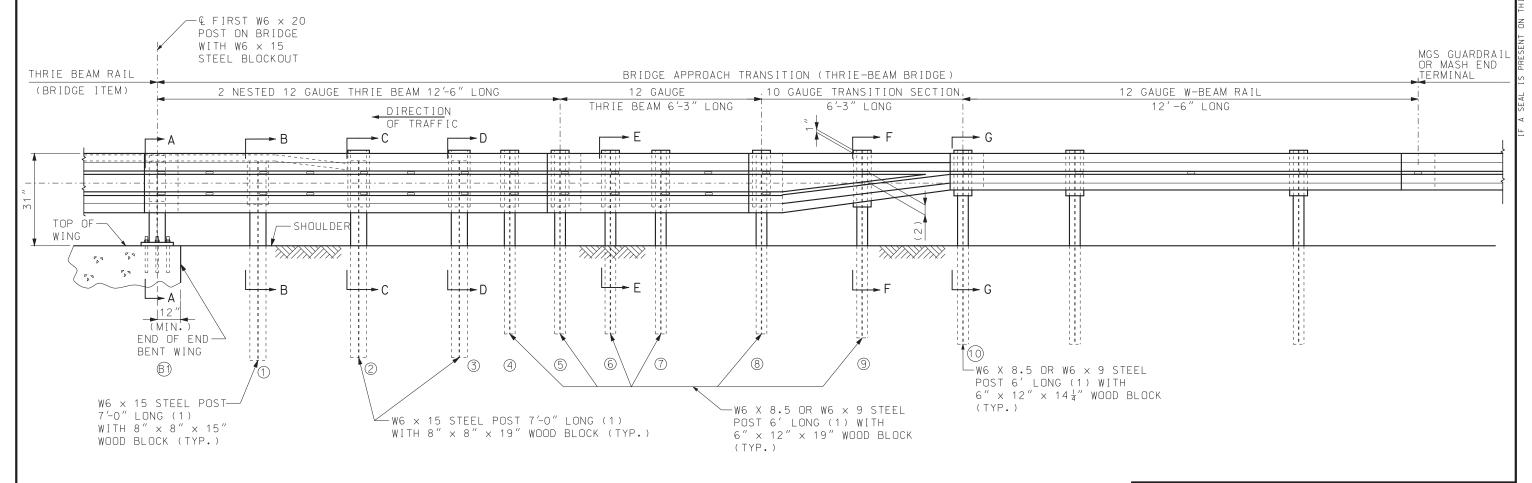
606.60B

SINGLE SLOPE BARRIERS

SHEET NO. 6 OF 6



## PLAN



# PART SECTION THROUGH SLAB AT END OF WING

#### NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

- (1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.
- (2) VERIFY BY RAIL TRANSITION PRODUCER.



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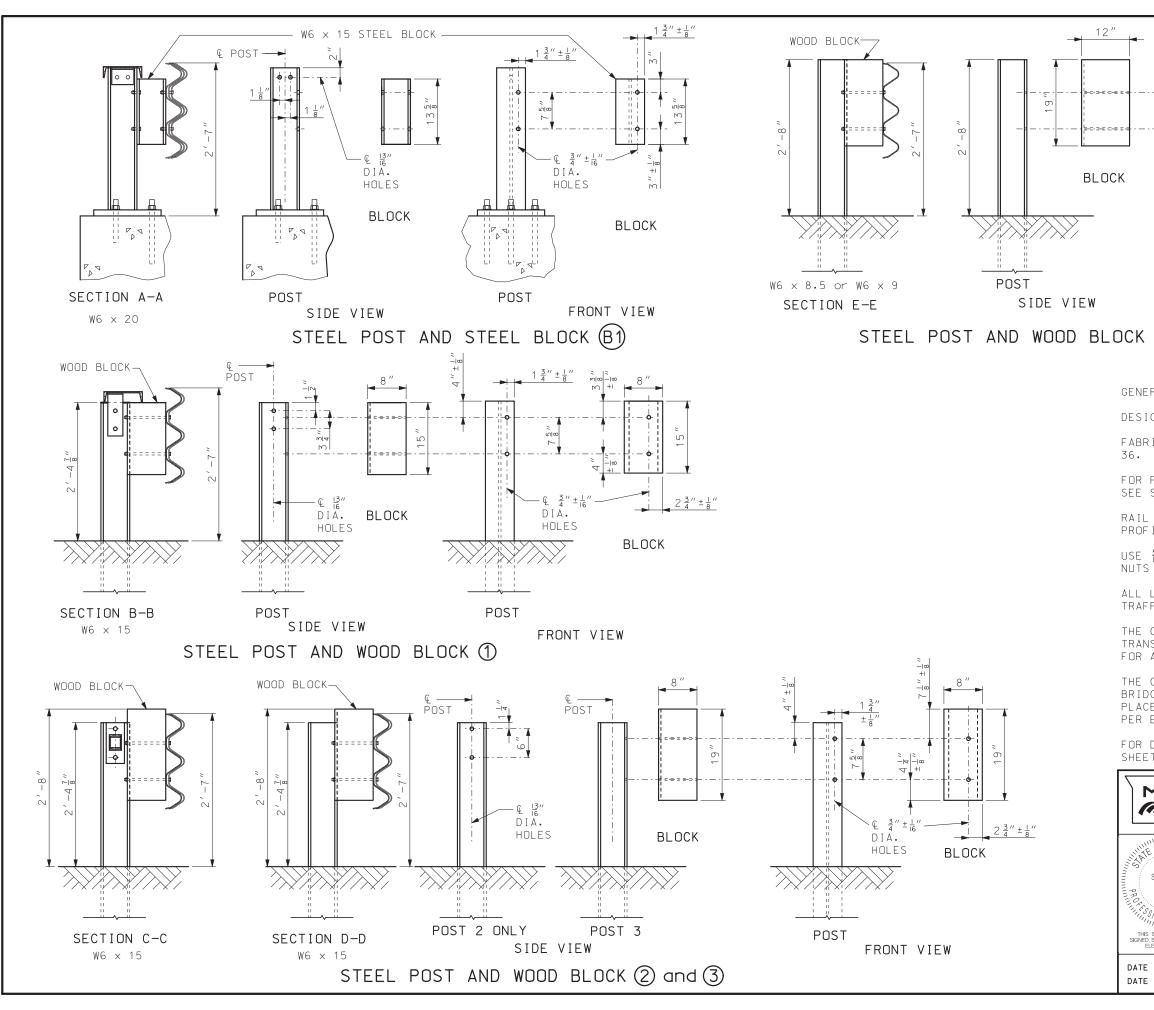
MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)

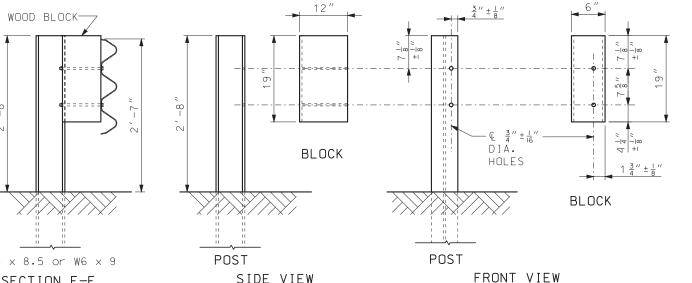
DATE EFFECTIVE: 07/01/2017 DATE PREPARED:

5/1/2017

606.70B

SHEET NO. 1 OF 5





STEEL POST AND WOOD BLOCK (4) THROUGH (8)

GENERAL NOTES:

DESIGN BASED UPON MASH TEST LEVEL 3 (TL-3).

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE  $\frac{5}{8}''$  BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS =  $\frac{3}{8}''$  MIN.) AT ALL SLOTS.

ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.



JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)

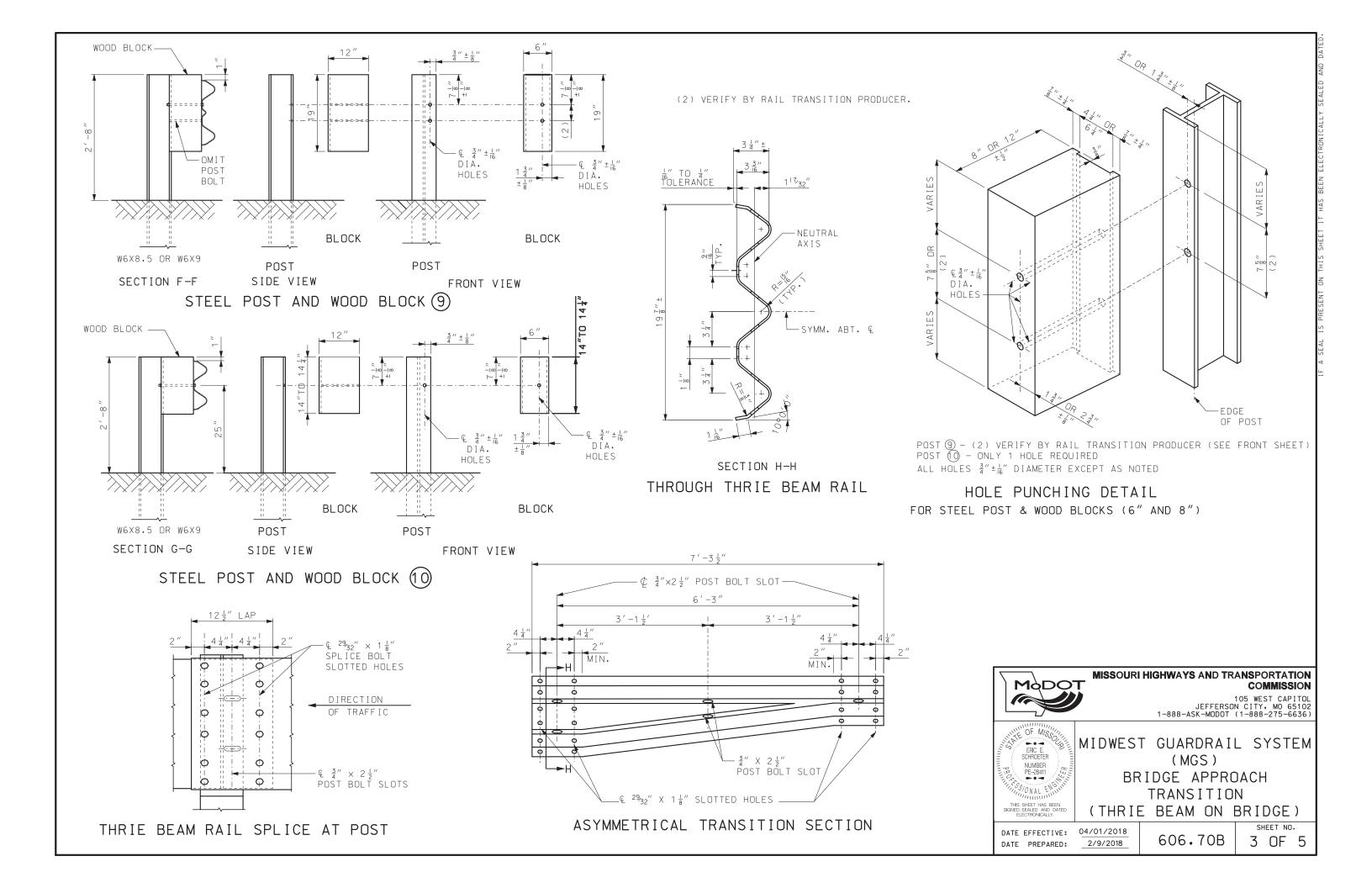
DATE EFFECTIVE: DATE PREPARED:

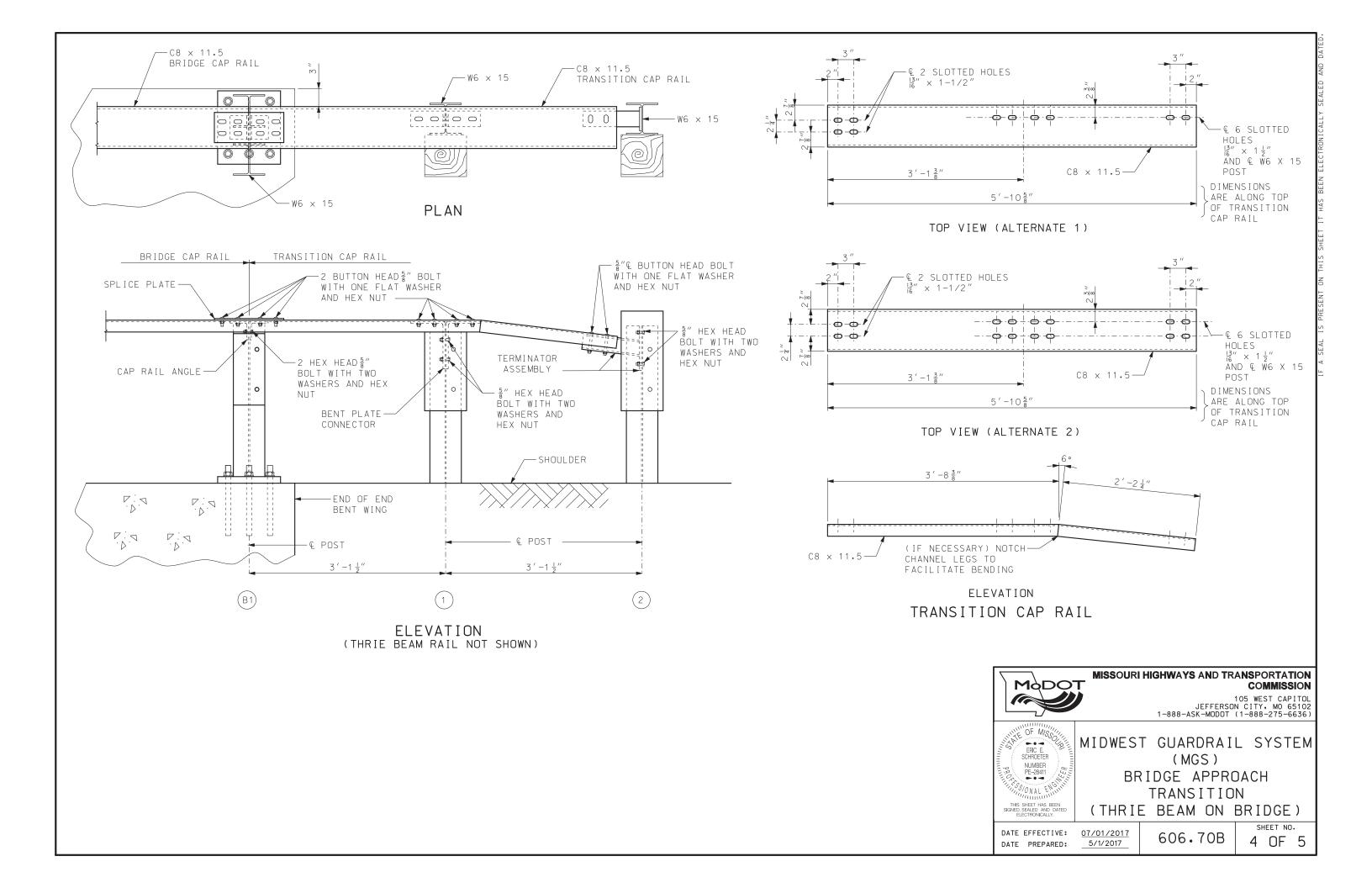
07/01/2017 5/1/2017

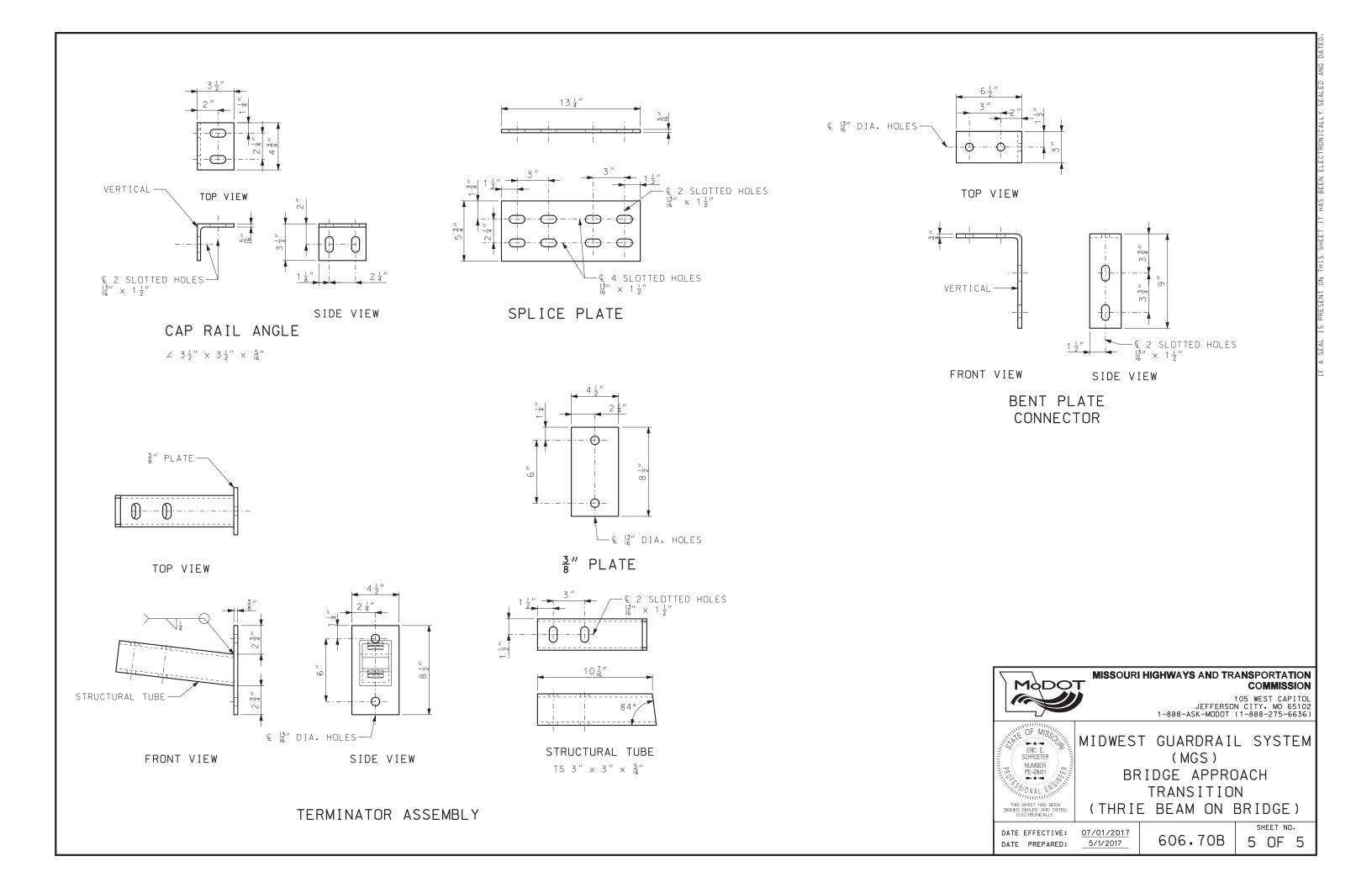
606.70B

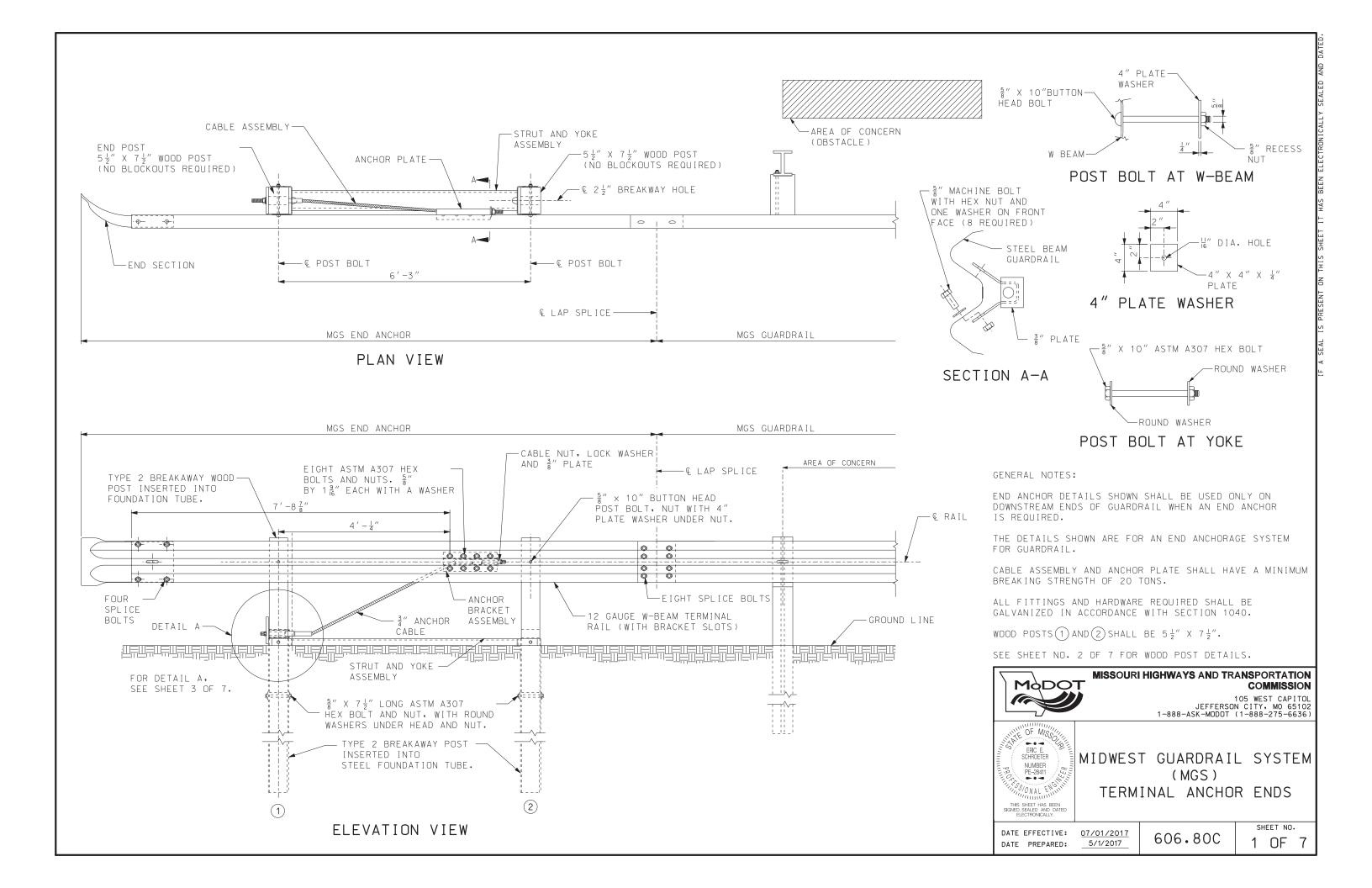
SHEET NO.

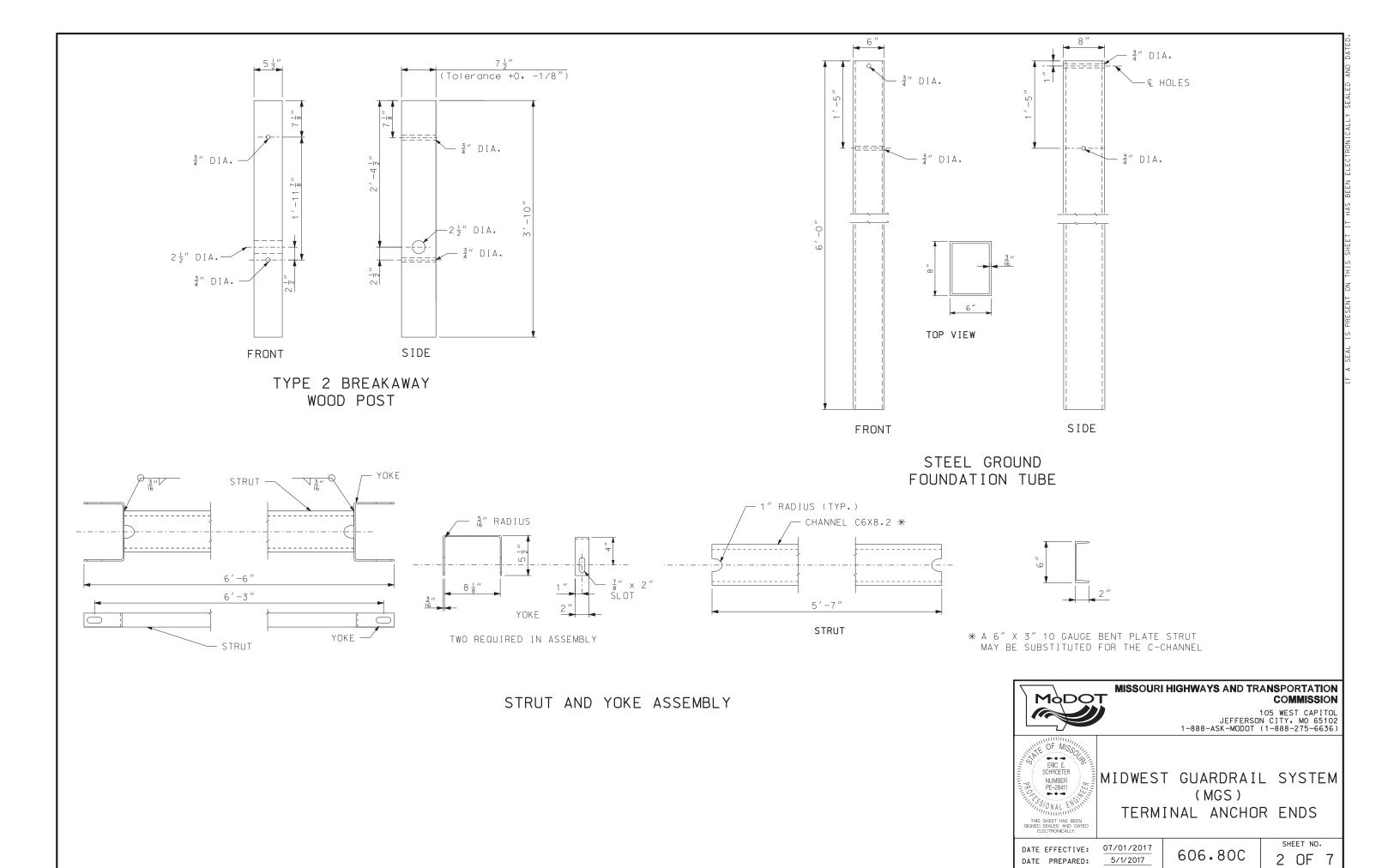
2 OF 5

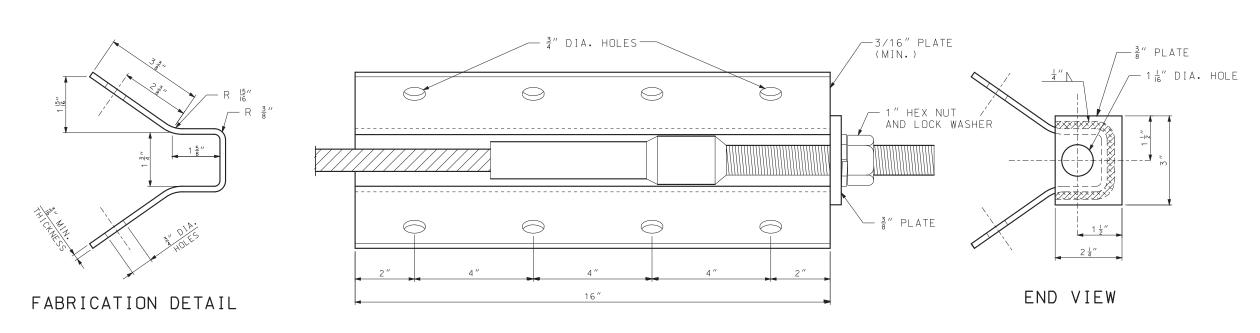




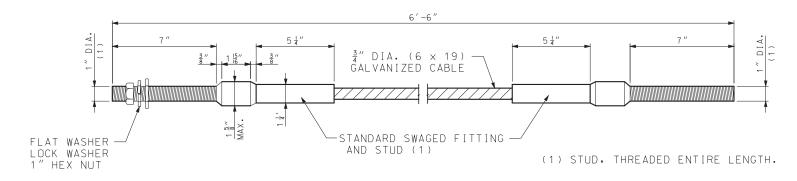




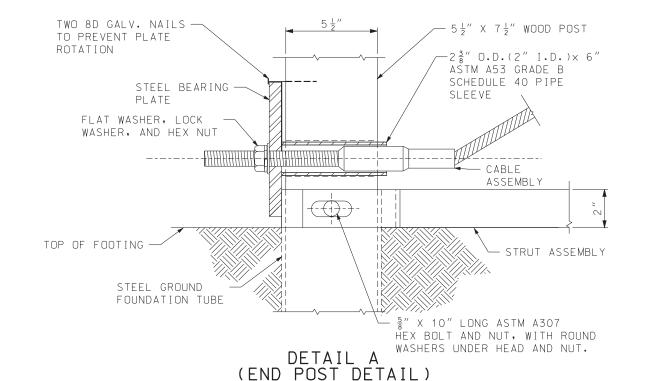




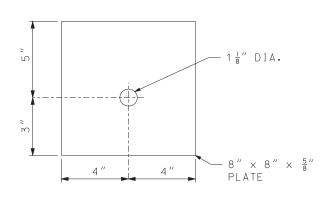
ASSEMBLED VIEW ANCHOR BRACKET



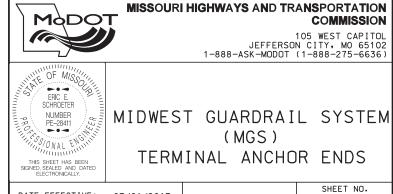
CABLE ASSEMBLY



FOR LOCATION OF DETAIL A, SEE SHEET 1 OF 7.



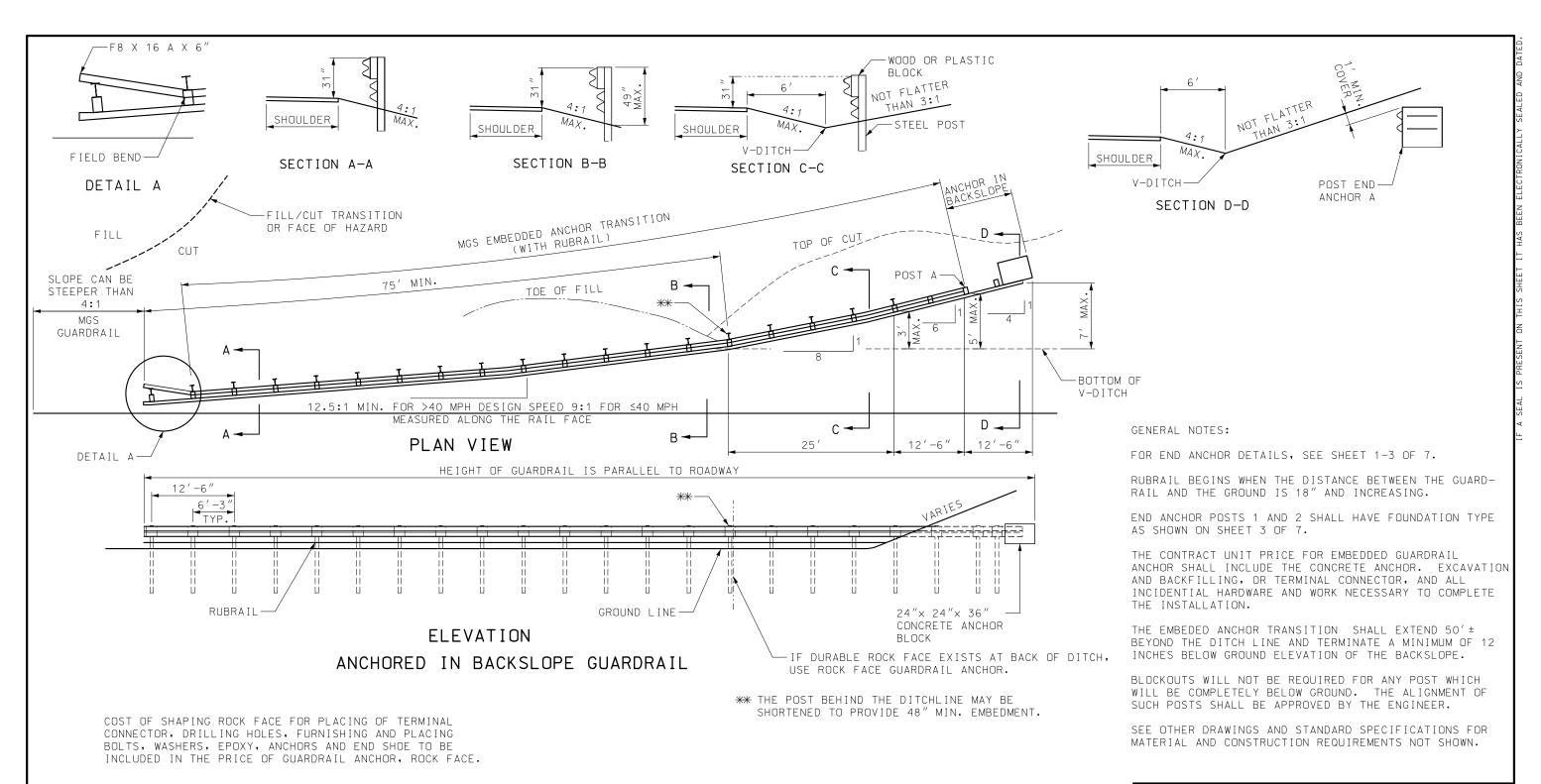
STEEL BEARING PLATE



DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

606.80C

3 OF 7



FOUR 7 X 6" HEX-HEAD DITCH MACHINE BOLTS ELEVATION AND WASHERS (1) HEIGHT ABOVE DITCH IS ANCHOR TERMINAL RUBRAIL EQUAL TO RAIL ELEVATION CONNECTOR TO FACE AT THE DITCH CROSSING. OF ROCK CUT

ROCK FACE GUARDRAIL ANCHOR

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MODOT

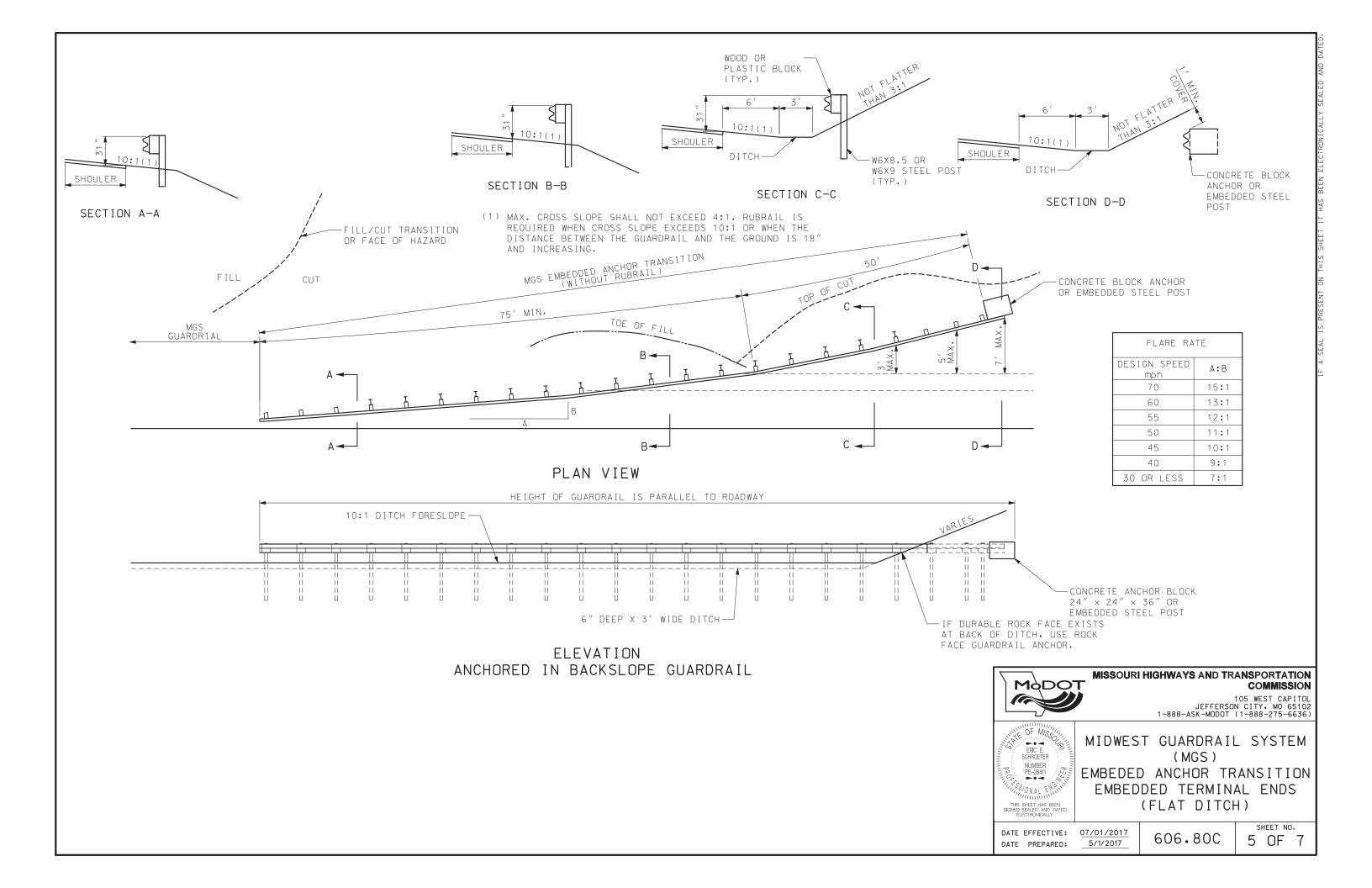
MIDWEST GUARDRAIL SYSTEM (MGS) TERMINAL ENDS EMBEDDED AND ROCK FACE (V-DITCH STEEPER THAN 10:1, 4:1 MAX. FORESLOPE)

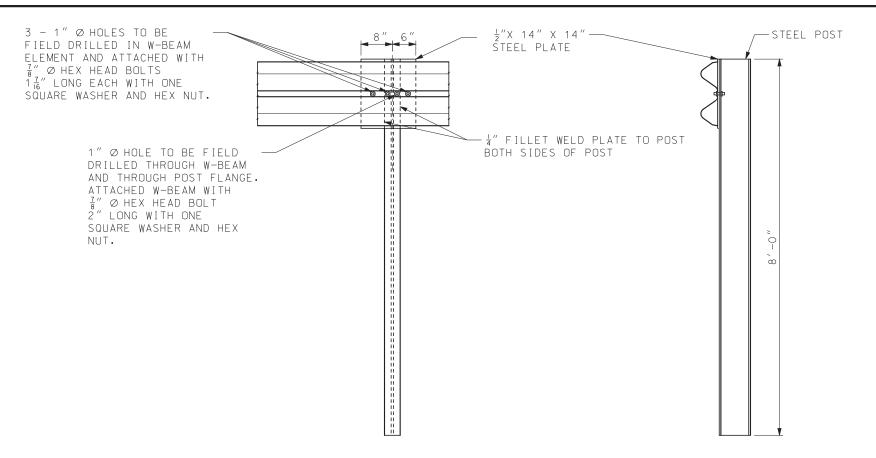
DATE EFFECTIVE: 07/01/2021 DATE PREPARED:

4/29/2021

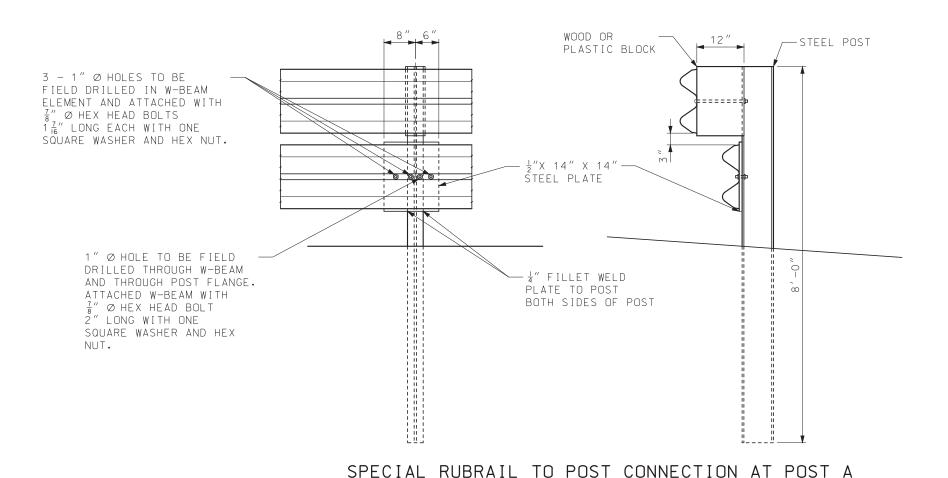
606.80C

SHEET NO. 4 OF 7





## EMBEDDED STEEL POST





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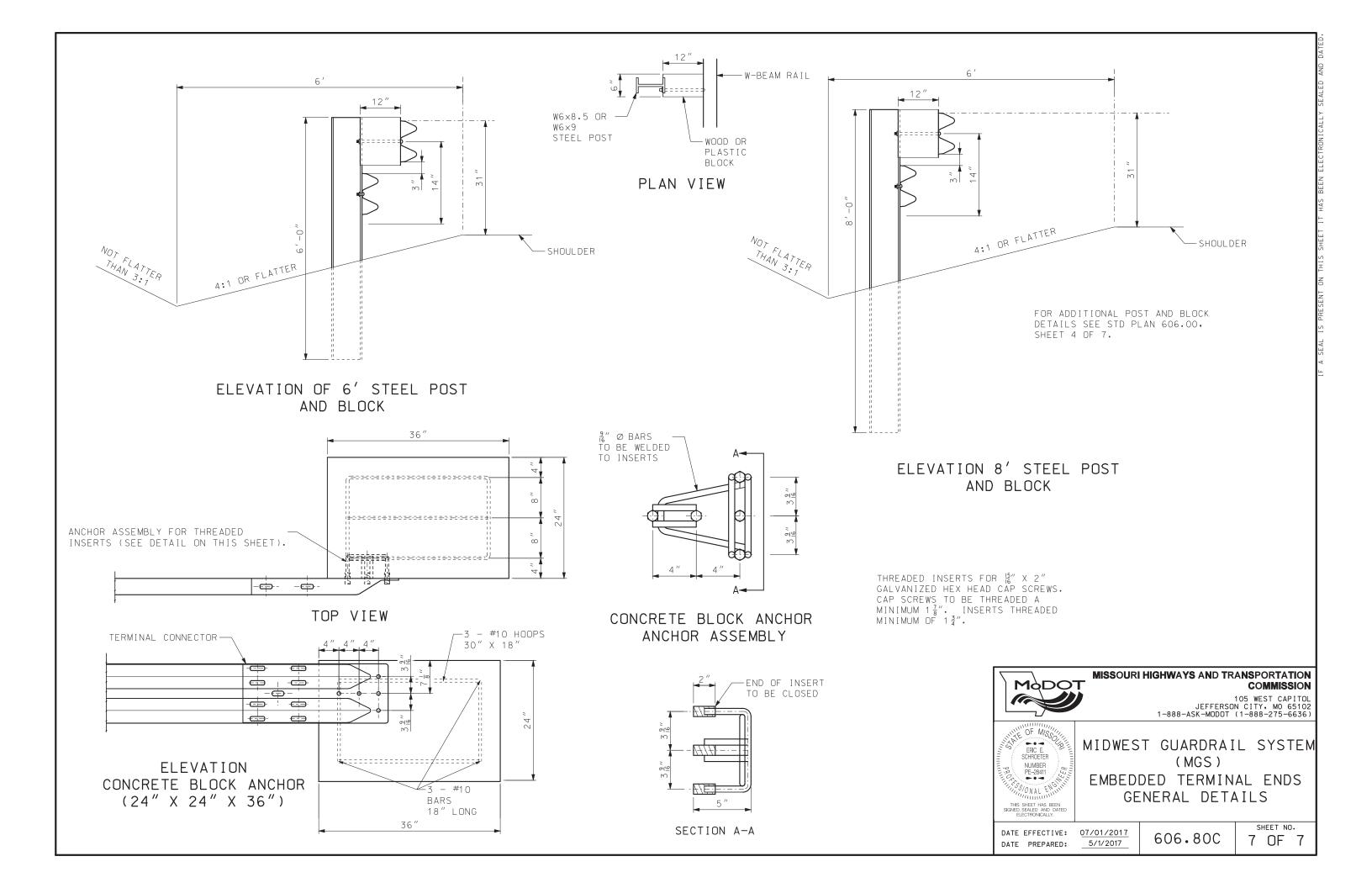


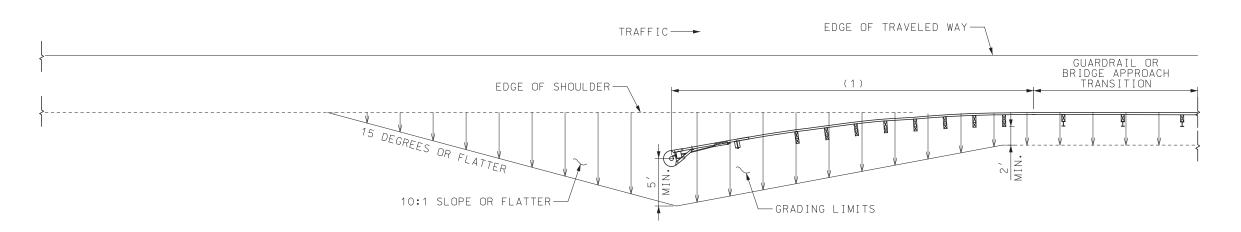
MIDWEST GUARDRAIL SYSTEM (MGS) EMBEDDED ANCHOR TERMINAL ENDS (STEEL POST OPTION)

DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

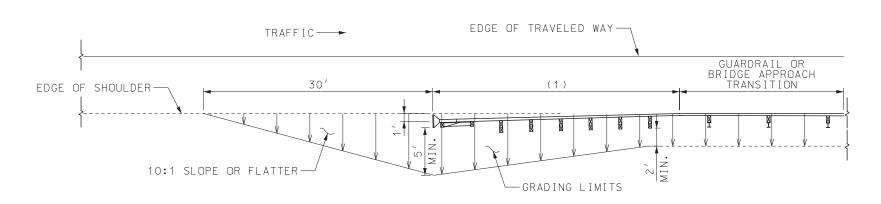
606.80C

SHEET NO. 6 OF 7

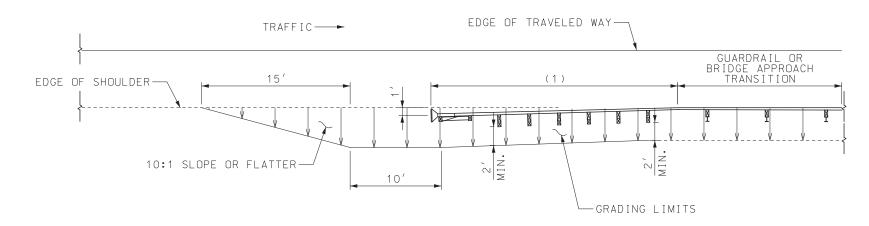




#### GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



#### STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS

#### GENERAL NOTES:

STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE MASH APPROVED CRASHWORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED



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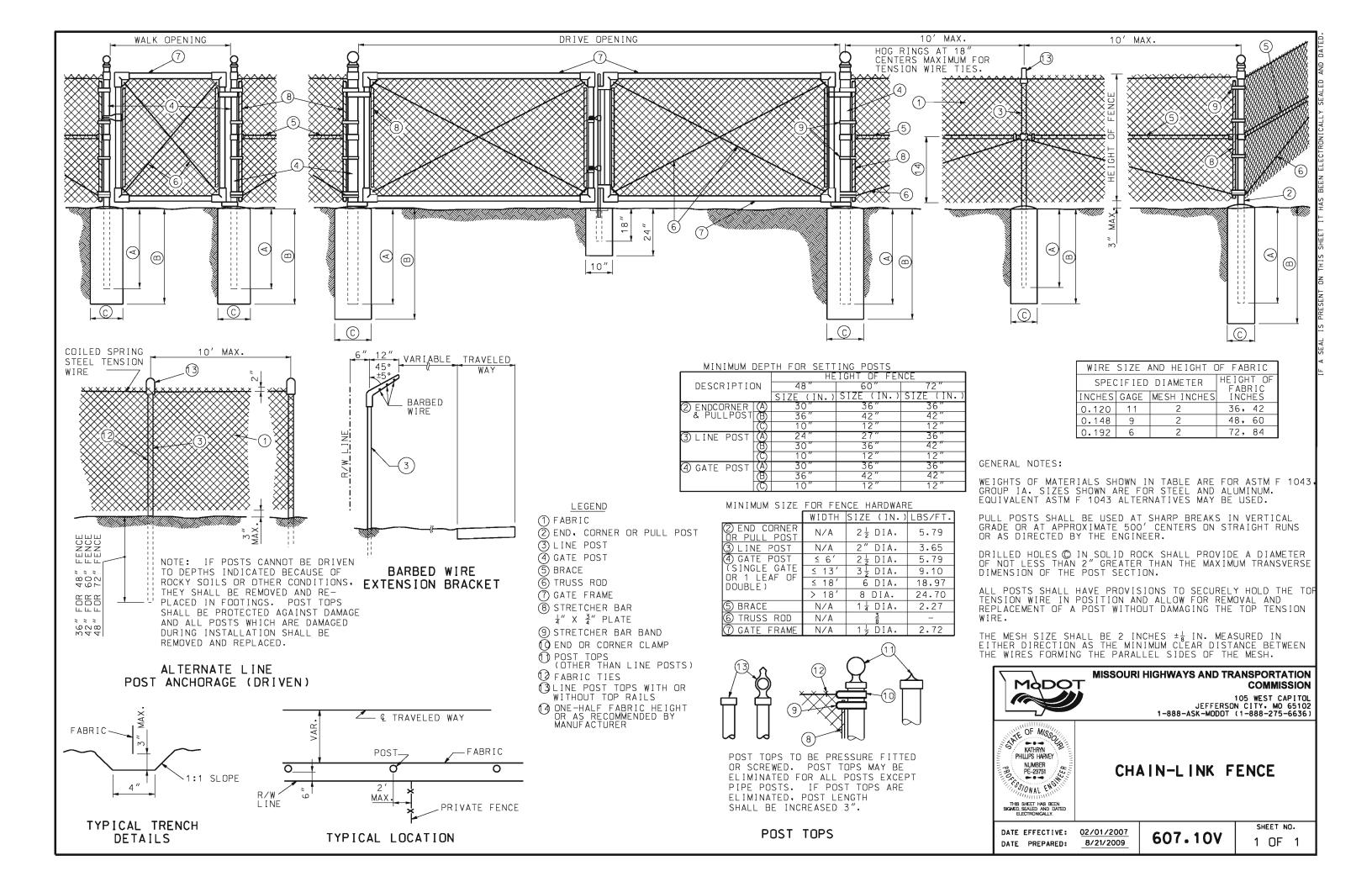


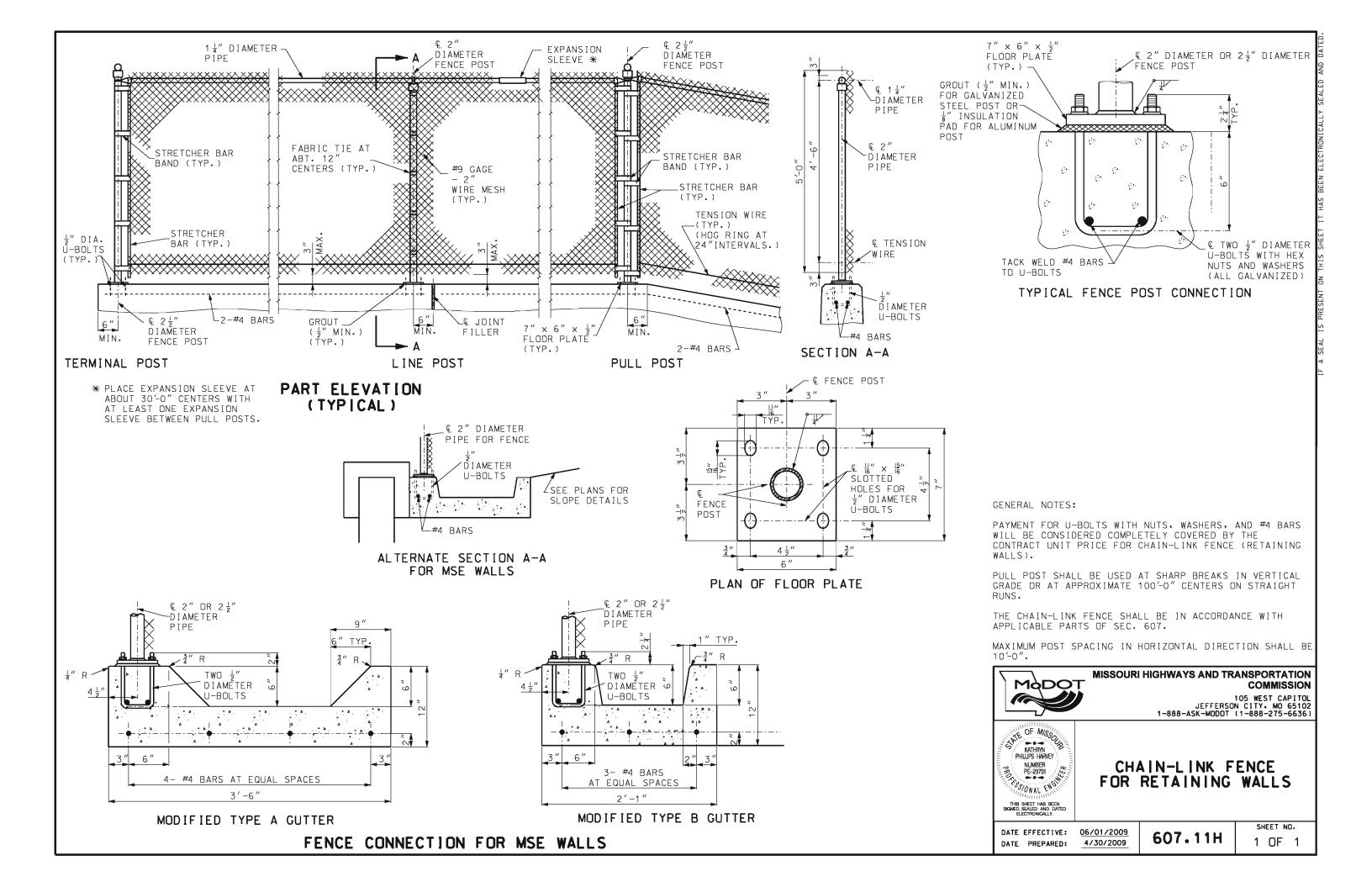
# MASH CRASHWORTHY END TERMINALS TYPE A GRADING LIMITS

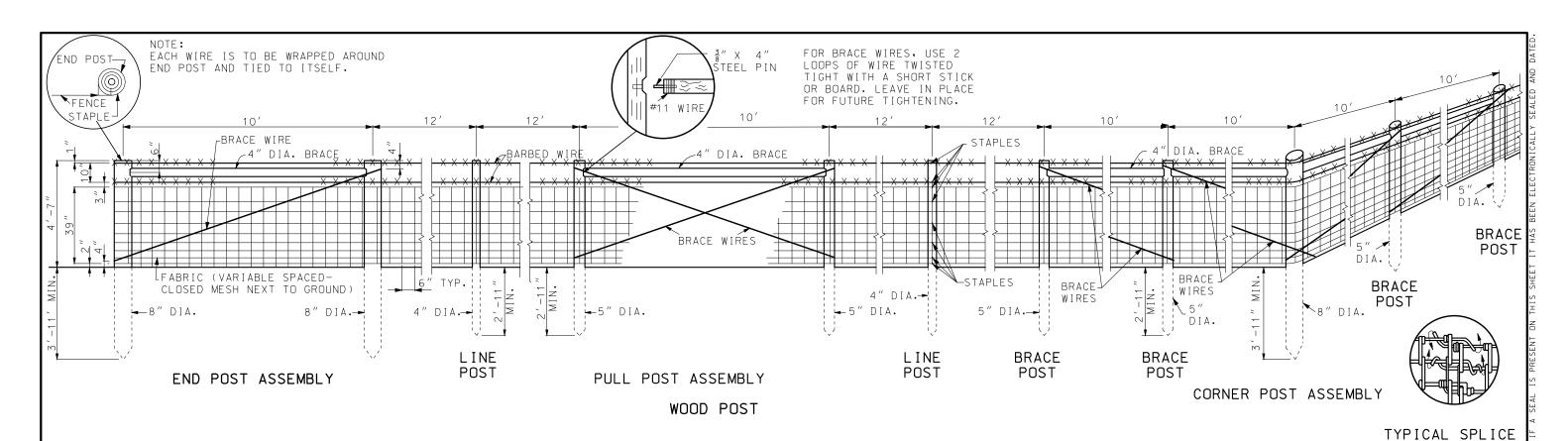
DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019

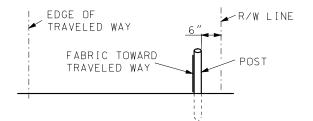
606.81B

SHEET NO. 1 OF 1



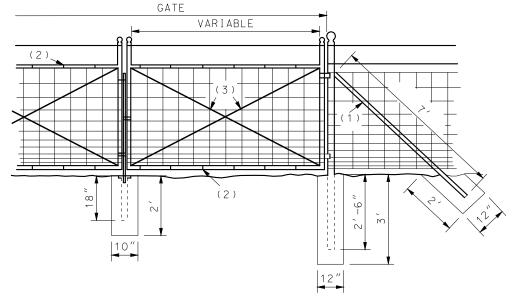






#### TYPICAL FENCE LOCATION

GATE OPEN	NG GATE PC	ST SIZE	#/FT.
≤ 6′	2 "	DIA.	3.65
≤13′	2 ½"	DIA.	5.79
≤18′	3 ½"	DIA.	9.10
>18′	6"	DIA.	18.97
GATE FRAM	1 ½"	DIA.	2.72



- 1. BRACES
- 2. WIRE TIES
- 3. 3.8" ADJUSTABLE TRUSS RODS.

GENERAL NOTES:

STEEL LINE POSTS SHALL BE OF AN APPROVED "U", "Y", "T" OR CHANNEL SECTION, NOTCHED OR STUDDED WITH AN ANCHOR PLATE, POST PUNCHED WITH HOLES OR SELF FASTENING LUGS WILL NOT BE PERMITTED.

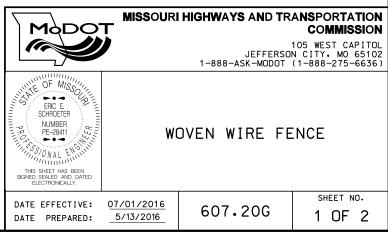
STAPLES SHALL BE SCREW SHANK TYPE OR EQUIVALENT (1 $\frac{1}{4}$ " MINIMUM LENGTH).

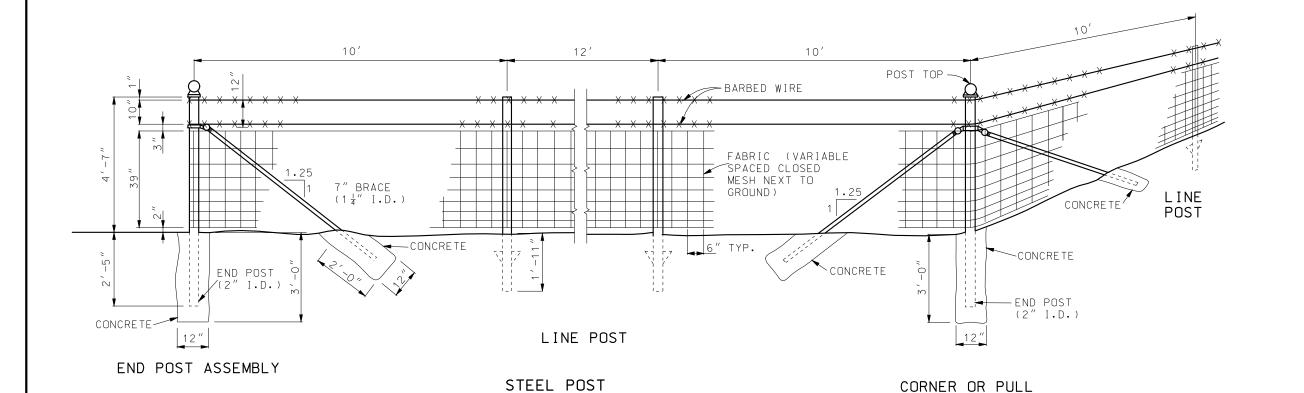
STRETCHED FABRIC AND BARBED WIRE ON OUTSIDE OF POST ON CORNERS AND CURVES.

ATTACHMENT OF FABRIC TO STEEL LINE POSTS IN ACCORD-ANCE WITH MANUFACTURE'S RECOMMENDATION.

GATES FOR WOVEN WIRE FENCE SHALL BE IN ACCORDANCE WITH SEC 607.20 AND 1043.3.6 OF THE STANDARD SPECIFICATIONS. EXCEPT THE FILLER SHALL BE WOVEN WIRE FABRIC OF THE SAME KIND AS USED FOR THE FENCE.

SINGLE LEAF GATES REQUIRE UP TO 12" OPENING. DOUBLE LEAF GATES REQUIRE OVER 12" OPENING. DIRECTION OF SWING OF GATES SHALL BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.





25' MAX. SPANS

ADD FOR SPANS
OVER 12"
(1\frac{1}{4}" I.D.)

1\frac{1}{4}" I.D. FOR SPANS \(\beta\) 1" \(\chi\) 6"

CONCRETE

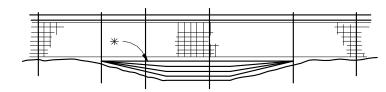
POST SHALL BE SAME
AS CORNER POST

\*\*\* U-CLAMP TO WOOD POST

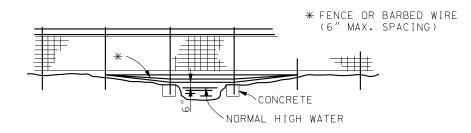
TYPICAL WATER CROSSING GATE

POST ASSEMBLY

ROADWAY DITCHES OR SMALL SHALLOW CHANNELS (SPAN WITH NORMAL LINE POST SPACING)



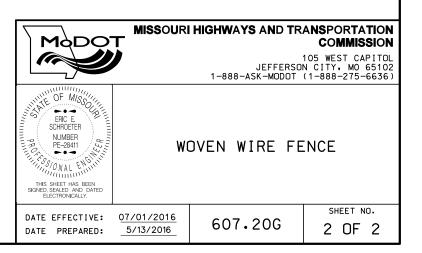
POORLY DEFINED CHANNELS (SMALL DRAINAGE AREAS)

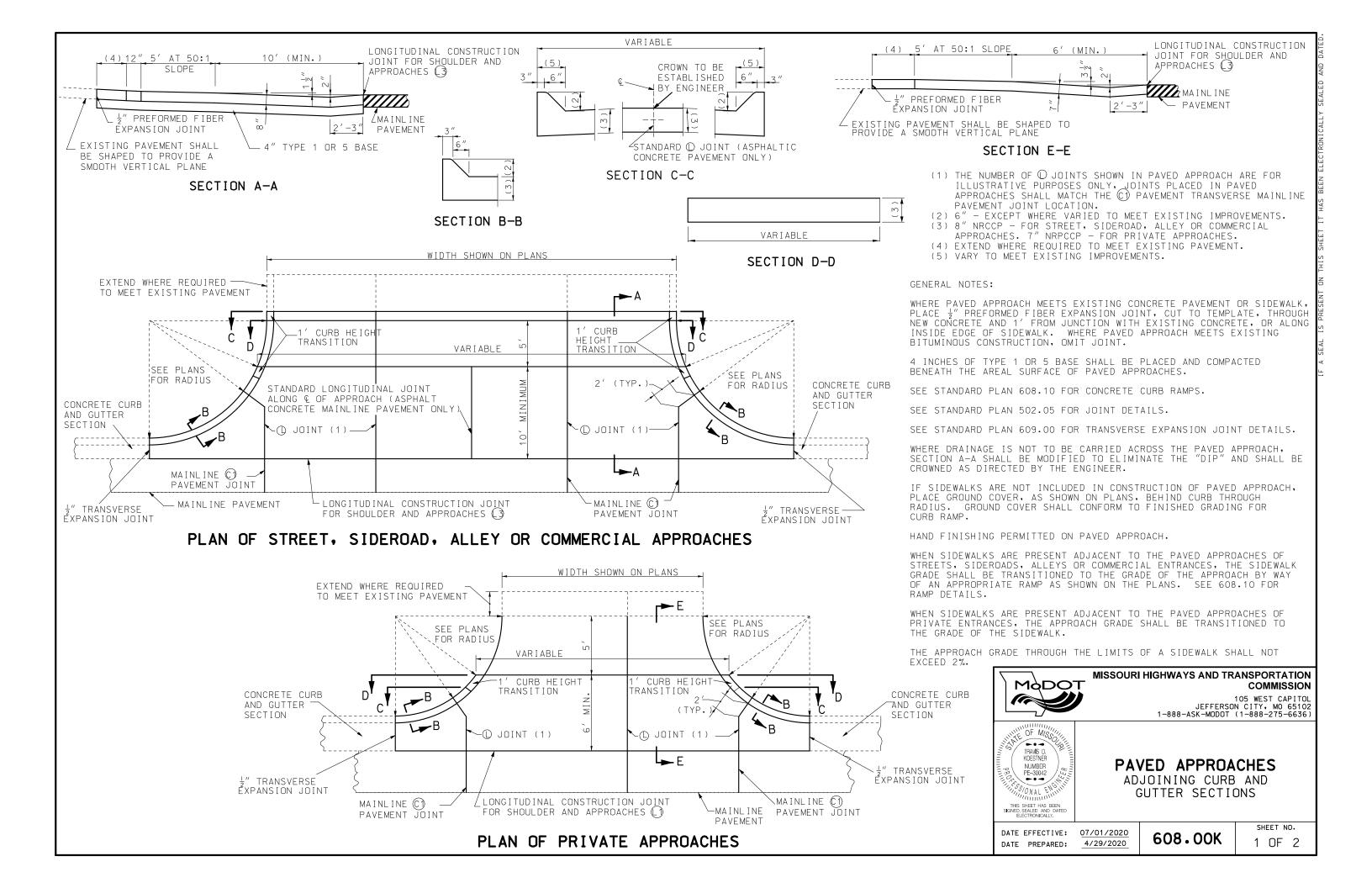


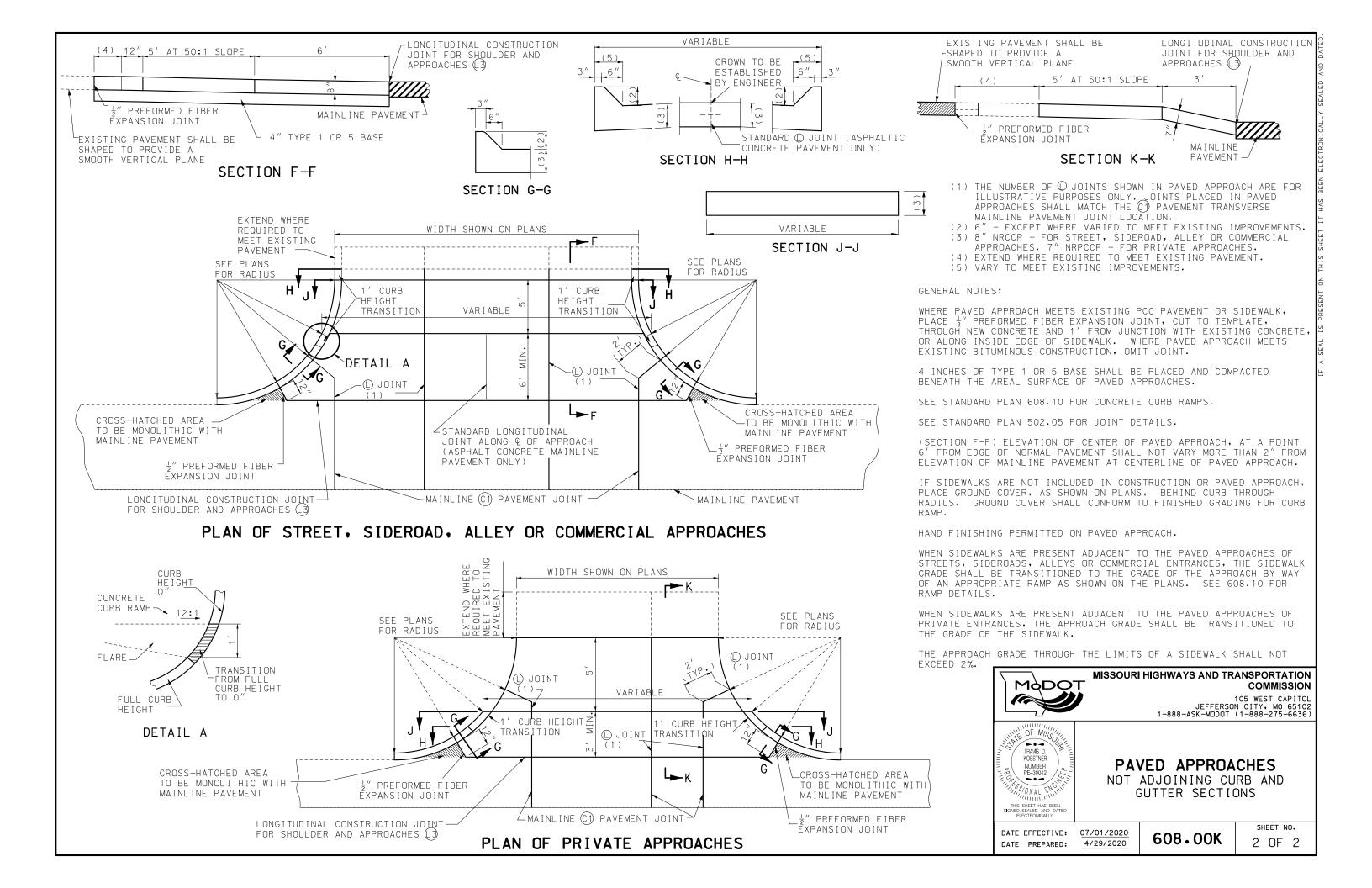
WELL DEFINED CHANNELS (LARGE DRAINAGE AREAS)

TYPICAL FENCING AT

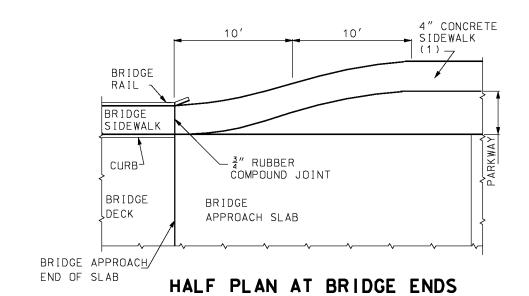
CHANNEL CROSSING

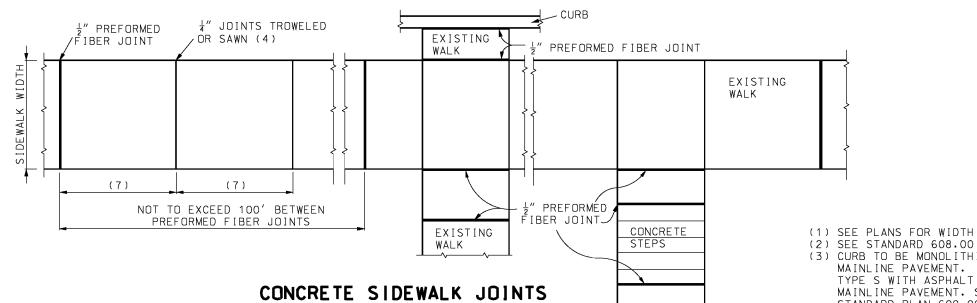




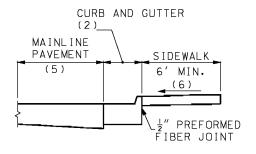


# TYPICAL SIDEWALK WITH PARKWAY 2' OR MORE





MAINLINE PAVEMENT WIDTH (CURB) (3)(5) 12" SIDEWALK 6' MIN. MIN. (6) ROADWAY SECTION PREFORMED FIBER JOINT



**CURB** 

CURB AND GUTTER

## TYPICAL SIDEWALK WITH NO PARKWAY

**GENERAL NOTES:** 

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABLILITES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY. EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT

WHERE SIDEWALKS ARE LESS THAN 5 FT., 5 FT. X 5 FT. PASSING SPACES EVERY 200 FT. SHALL BE PROVIDED AND ARE PERMITTED TO OVERLAP PEDESTRIAN ACCESS ROUTES.

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL. THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

STORMWATER INLETS, SIGNS, POSTS, MANHOLE COVERS, PULL BOXES AND OTHER ACCESS LIDS SHOULD BE AVOIDED WITHIN THE SIDEWALK. IF SUCH A LOCATION IS NECESSARY, THE FEATURE MUST MEET ADA STANDARDS.

THE RUNNING GRADE OF A SIDEWALK SHALL NOT EXCEED 5.0% UNLESS IT IS MATCHING THE GRADE OF THE ADJACENT ROADWAY.

PEDESTRIAN ACCESS ROUTE SHALL CONTINUE ACROSS RESIDENTIAL AND COMMERCIAL ENTRANCES. ALLEYS. AND SIDEROAD CONNECTIONS.



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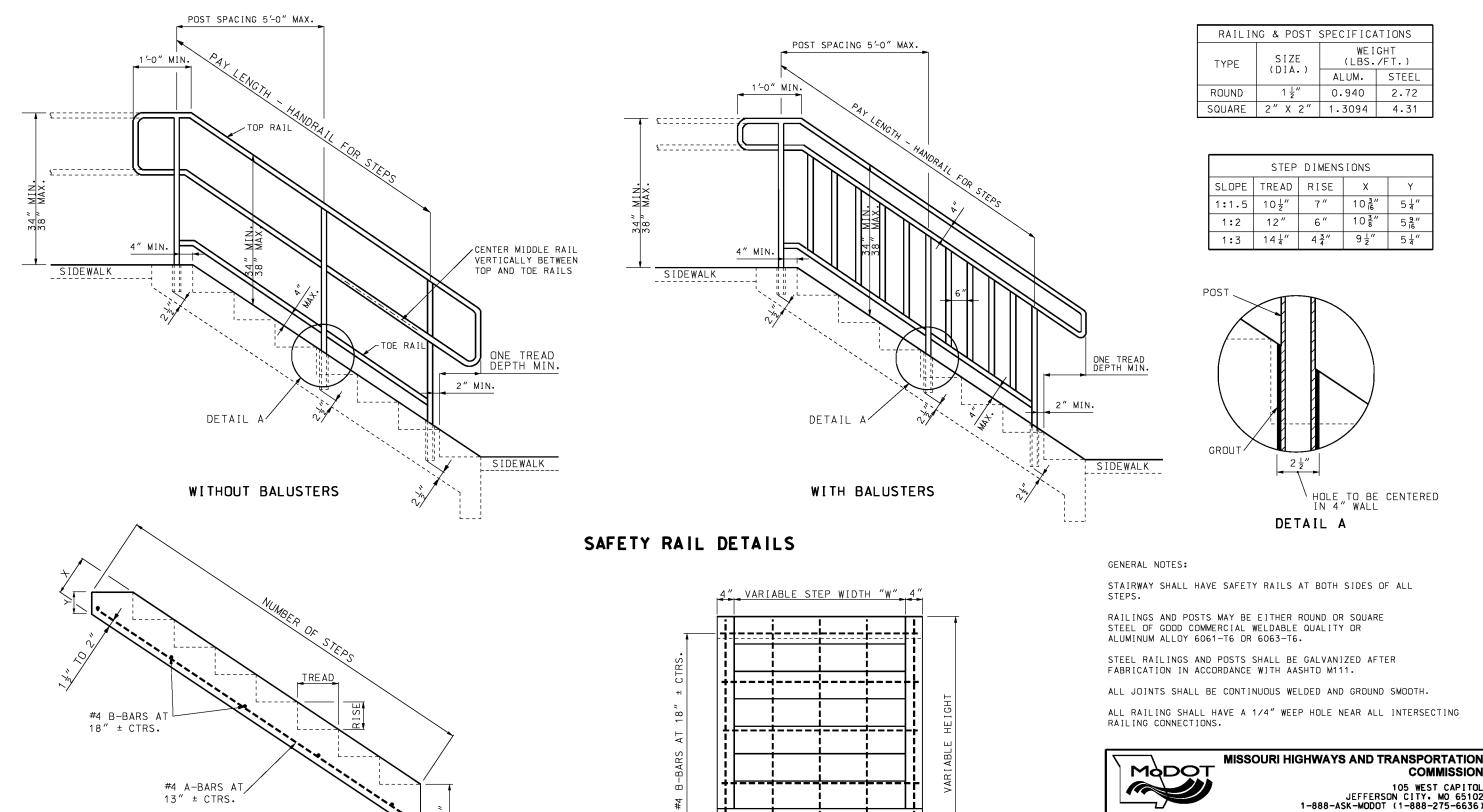


CONCRETE SIDEWALK

04/01/2015 DATE FEFFCTIVE: 2/20/2015 DATE PREPARED:

608.10P

- (3) CURB TO BE MONOLITHIC WITH PCC MAINLINE PAVEMENT. CURB TO BE TYPE S WITH ASPHALT CONCRETE MAINLINE PAVEMENT. SEE STANDARD PLAN 609.00.
- (4) MIN.  $\frac{1}{2}$ " DEPTH JOINT.
- (5) SEE TYPICAL PAVEMENT SECTION
- (6) SLOPE 1.0% (2.0% MAX.)
- (7) SPACING EQUAL TO WIDTH OF WALK

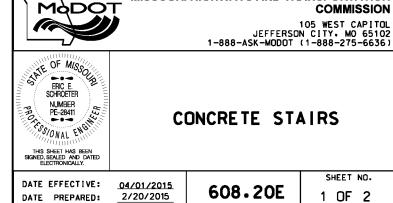


STAIRWAY STEP DETAILS

SIDE ELEVATION

#4 A-BARS AT 13" ± CTRS.

FRONT ELEVATION



STEEL

2.72

4.31

5 ¼″

5흠"

5 🛓 "

	QUANTITIES FOR CONCRETE STEPS CONCRETE C.Y. STEEL LB.													
				10½"	TREAD		1:1.	.5 SLO	IPE	7 "	RISE			
W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2′	CONC.	0.20	0.29	0.38	0.47	0.56	0.65	0.74	0.83	0.92	1.01	1.10	1.19	1.28
	STEEL	10	13	16	20	24	28	30	34	38	42	46	48	52
3′	CONC.	0.27	0.39	0.51	0.63	0.75	0.88	1.00	1.12	1.24	1.36	1.48	1.60	1.73
	STEEL	13	18	21	27	32	38	41	46	52	57	63	65	71
4'	CONC.	0.34	0.49	0.64	0.80	0.95	1.10	1.25	1.40	1.56	1.71	1.86	2.01	2.17
	STEEL	17	23	27	34	41	48	52	59	66	73	80	83	90
5′	CONC.	0.41	0.59	0.78	0.96	1.14	1.33	1.51	1.69	1.88	2.06	2.24	2.42	2.61
٦	STEEL	21	28	33	42	50	59	63	71	80	88	97	101	109
6′	CONC.	0.48	0.70	0.91	1.12	1.34	1.55	1.77	1.98	2.19	2.41	2.62	2.84	3.05
Ů	STEEL	24	33	39	49	59	69	74	84	94	104	114	118	128
				12′	" TREA	.D	1:	2 SLO	PE .	6″	RISE			
W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2'	CONC.	0.18	0.26	0.33	0.41	0.49	0.56	0.64	0.72	0.80	0.87	0.95	1.03	1.10
2	STEEL	10	12	16	19	23	25	29	33	36	39	42	46	50
3'	CONC.	0.25	0.35	0.45	0.56	0.66	0.76	0.87	0.97	1.07	1.18	1.28	1.38	1.49
	STEEL	13	16	21	26	32	34	39	45	50	53	58	63	68
4'	CDNC.	0.31	0.44	0.57	0.70	0.83	0.96	1.09	1.22	1.35	1.48	1.61	1.74	1.87
	STEEL	17	20	27	33	40	44	50	57	63	67	73	81	87
5′	CONC.	0.38	0.53	0.69	0.85	1.00	1.16	1.31	1.47	1.63	1.78	1.94	2.10	2.25
	STEEL	21	25	33	41	49	53	61	69	77	82	89	98	105
6′	CONC.	0.44	0.62	0.81	0.99	1.17	1.36	1.54	1.72	1.90	2.09	2.27	2.45	2.64
L	STEEL	24	29	39	48	58	62	71	81	90	96	105	115	124
				14:	¦″ TRE	AD	1	:3 SL	OPE	4 <del>3</del> "	RISE			
W	NO. STEPS	2	3	4	5	6	7	8	9	10	11	12	13	14
2′	CONC.	0.19	0.27	0.35	0.43	0.51	0.59	0.68	0.76	0.84	0.92	1.00	1.08	1.16
	STEEL	10	14	18	21	25	29	33	37	41	43	47	51	55
3′	CONC.	0.26	0.37	0.48	0.59	0.70	0.80	0.91	1.02	1.13	1.24	1.35	1.46	1.56
	STEEL	14	19	25	28	34	39	45	50	56	59	65	70	76
4′	CONC.	0.33	0.47	0.61	0.74	0.88	1.02	1.15	1.29	1.42	1.56	1.70	1.83	1.97
Ĺ	STEEL	18	25	32	36	43	50	57	64	71	75	82	89	96
5′	CONC.	0.40	0.57	0.73	0.90	1.06	1.22	1.39	1.55	1.72	1.88	2.05	2.21	2.38
Ľ	STEEL	22	30	39	44	52	61	69	78	86	91	100	108	117
6′	CONC.	0.47	0.66	0.86	1.05	1.24	1.43	1.63	1.82	2.01	2.21	2.40	2.59	2.78
_ p	STEEL	25	35	45	51	61	71	81	91	101	107	117	127	137



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

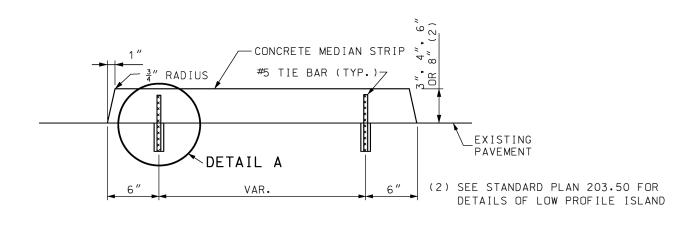


# CONCRETE STAIRS

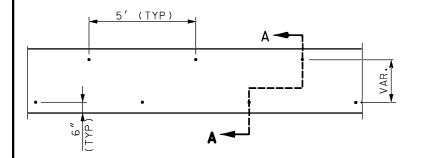
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DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

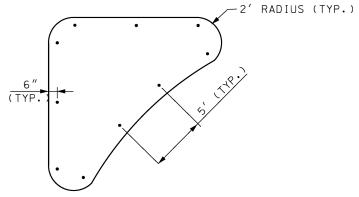
608.20E



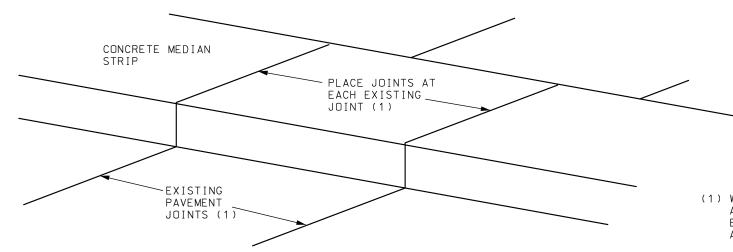
SECTION A-A CONCRETE MEDIAN STRIP



TIE BAR LOCATIONS FOR CONCRETE MEDIAN STRIP

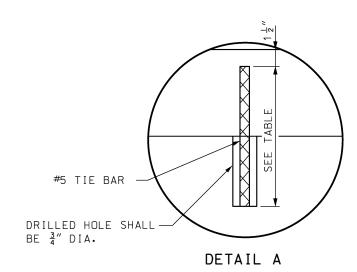


TIE BAR LOCATIONS FOR CONCRETE MEDIAN STRIP (ISLAND)



CONCRETE MEDIAN STRIP JOINT LOCATION

(1) WHEN THERE ARE NO VISIBLE JOINTS IN THE ADJACENT PAVEMENT. THE JOINT SPACING WILL BE EQUAL TO THE MEDIAN STRIP WIDTH, WITH A MINIMUM SPACING OF 10'.



MEDIAN HEIGHT	BAR LENGTH
3"	8"
4 "	9″
6"	11"
8 "	13"

GENERAL NOTES:

TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTION 710 AND

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

THE FACE OF THE MEDIAN MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6' OR LESS.

WHEN CONCRETE MEDIANS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, THE MEDIAN HEIGHT WILL BE 4".



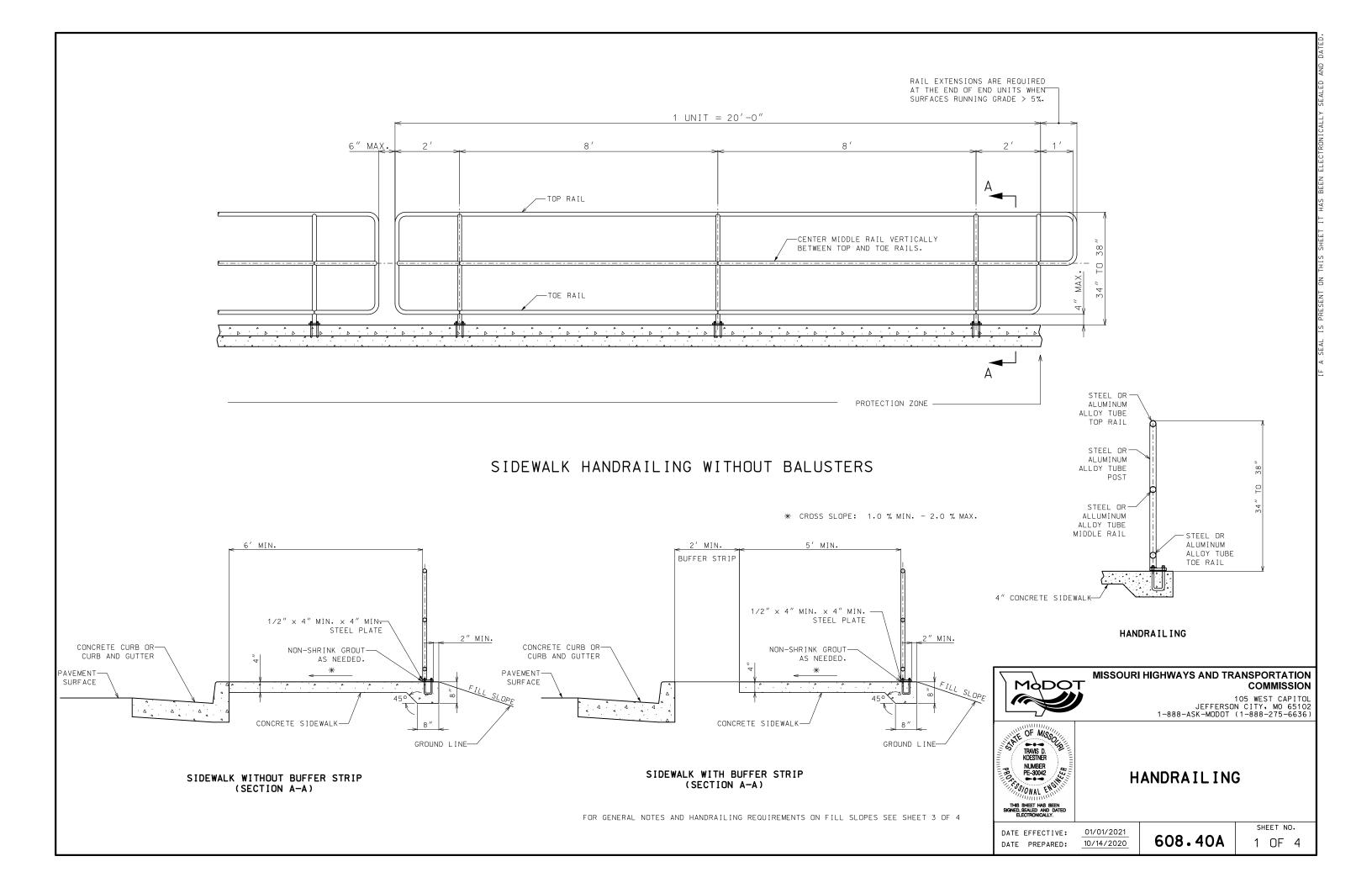


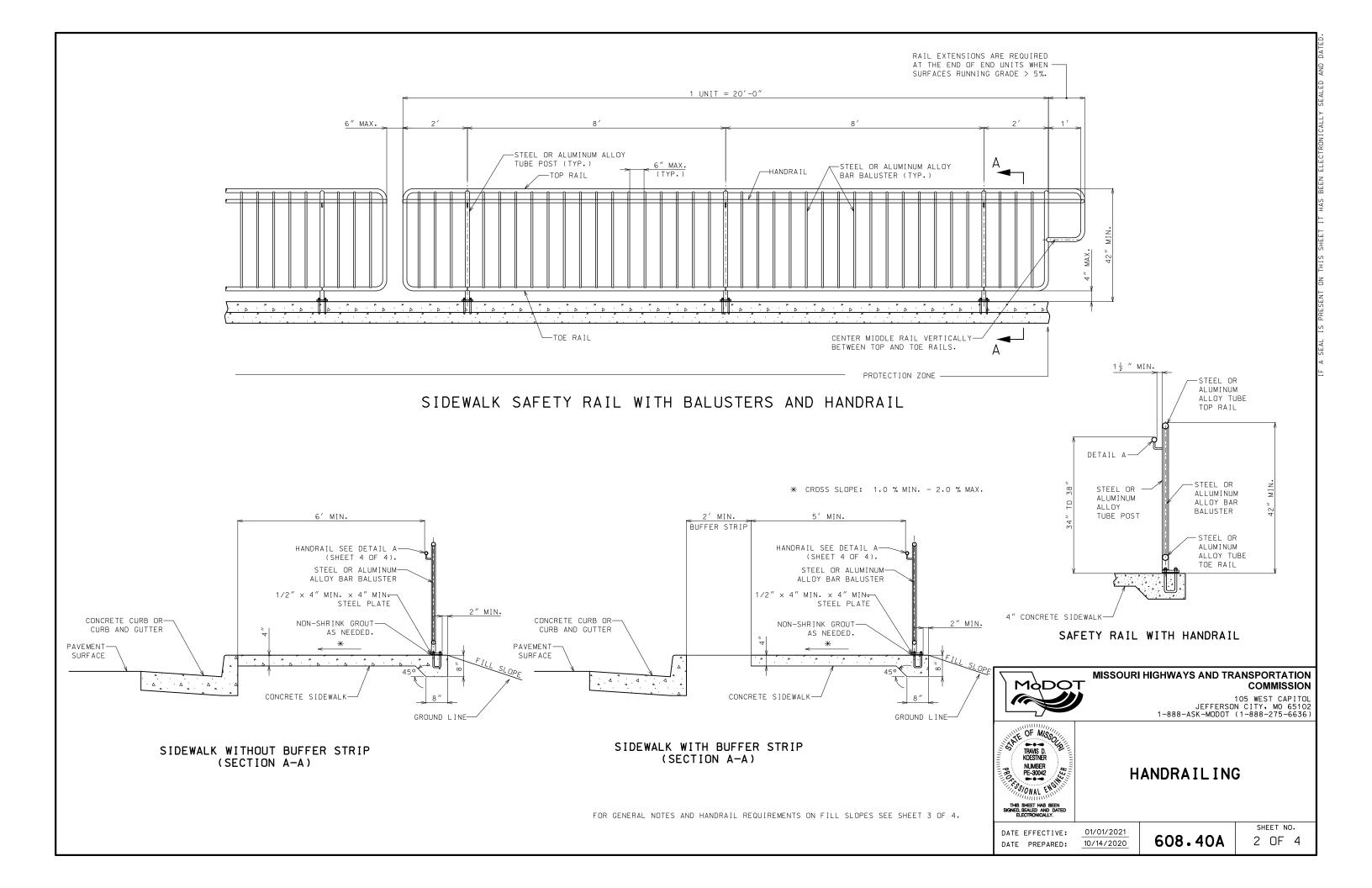
# CONCRETE MEDIAN STRIP

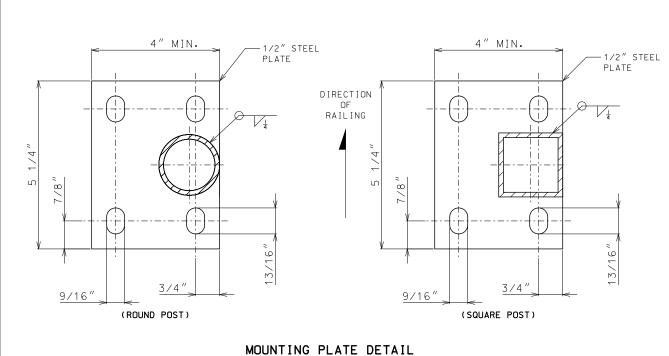
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7/21/2020

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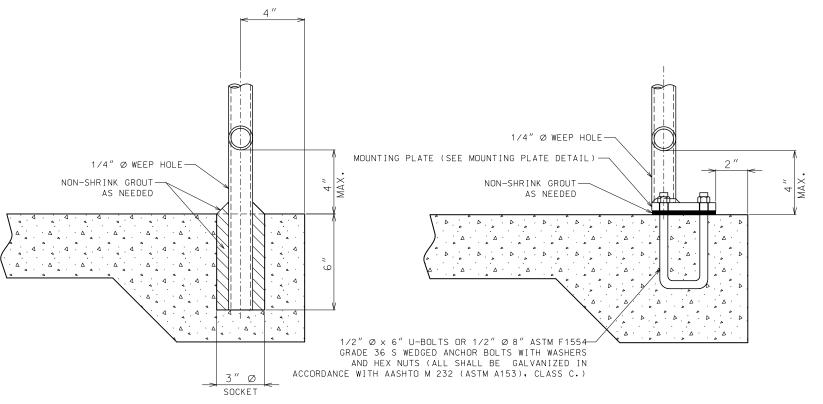
(PLAN VIEW)

HANDRAIL REQUIREMENTS					
FILL SLOPE	FILL HEIGHT	HANDRAIL			
(1V:3H) OR FLATTER		NOT REQUIRED			
(1V:3H) OR STEEPER	> 6 FT.	REQUIRED			
(1V:2H) OR STEEPER	≥ 4 FT.	REQUIRED			

> 1 FT.

REQUIRED

(1V:1H) OR STEEPER



SOCKET MOUNTING DETAIL

#### PLATE MOUNTING DETAIL

GENERAL NOTES:

RAILINGS AND POSTS MAY BE EITHER ROUND OR SQUARE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

STEEL RAILINGS AND POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

ALL JOINTS SHALL BE CONTINUOUS WELDED AND GROUND SMOOTH.

METAL SAFETY RAIL MUST BE COMPLIANT WITH THE "AMERICAN'S WITH DISABLILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG)". EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

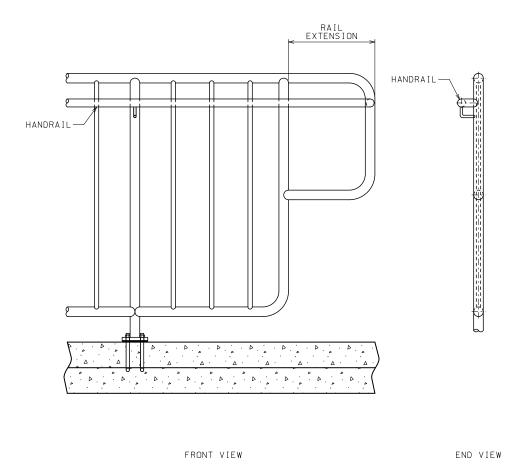
ALL POSTS SHALL HAVE A  $1/4^{\prime\prime}$  WEEP HOLE IMMEDIATELY ABOVE THE MOUNTING PLATE.

WHEN INSTALLED THE POSTS SHALL BE PLUMB AND RAILINGS SHALL MATCH THE SLOPE OF THE SIDEWALK.

RAILING AND POST SPECIFICATION								
DESCRIPTION	TYPE	TVDE SIZE						
DESCRIFTION	ITE	( DIA.)	ALUM.	STEEL				
RAILING & POST	ROUND	1 1/2"	0.940	2.720				
RAILING & FUST	SQUARE	2" X 2"	1.3094	4.310				
	ROUND	1/2″	0.2312	0.668				
BALUSTER	RECT.	3/8" X 1/2" STL.		0.6375				
	SQUARE	1/2" X 1/2" ALUM.	0.2944					







HANDRAIL AND EXTENSION CONNECTION

HANDRAIL GRIPPING SURFACES

 $-1\frac{1}{4}$ " - 2" O.D. MAX. CIRCULAR CROSS SECTION — 4" − 6¼" PERIMETER MAX.  $-4" - 6\frac{1}{4}"$  PERIMETER MAX.

NON-CIRCULAR CROSS SECTION

HANDRAIL NOTES:

HANDRAILS SHALL BE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

HANDRAILS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES.

HANDRAIL GRIPPING SURFACES SHALL BE CONTINUOUS ALONG THEIR LENGTH AND SHALL NOT BE OBSTRUCTED ALONG THEIR TOPS OR SIDES.

THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL NOT BE OBSTRUCTED FOR MORE THAN 20 PERCENT OF THEIR LENGTH.

WHERE HANDRAILS ARE PROVIDED ALONG WALKING SURFACES WITH SLOPES NOT STEEPER THAN 1:20, THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL BE PERMITTED TO BE OBSTRUCTED ALONG THEIR ENTIRE LENGTH WHERE THEY ARE INTEGRAL TO CRASH RAILS OR BUMPER GUARDS.

THE DISTANCE BETWEEN HORIZONTAL PROJECTIONS AND THE BOTTOM OF THE GRIPPING SURFACE SHALL BE PERMITTED TO BE REDUCED BY 1 FOR EACH 2 OF ADDITIONAL HANDRAIL PERIMETER DIMENSION THAT EXCEEDS 4".

HANDRAIL SURFACES AND ANY SURFACES ADJACENT TO THEM SHALL BE FREE OF SHARP OR ABRASIVE ELEMENTS AND SHALL HAVE ROUNDED EDGES.

HANDRAILS SHALL NOT ROTATE WITHIN THEIR FITTINGS.



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### **HANDRAILING**

DATE EFFECTIVE: DATE PREPARED:

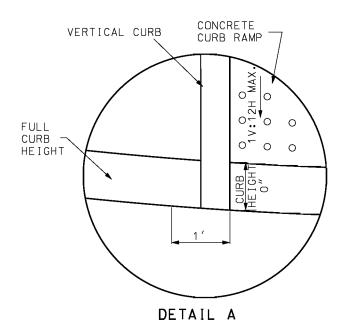
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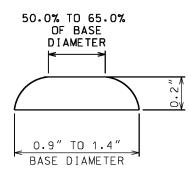
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4 OF 4

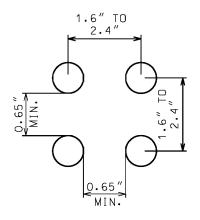
DETAIL A - HANDRAIL



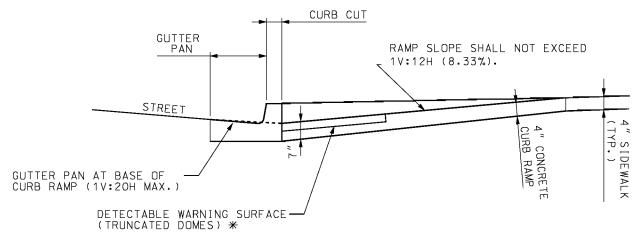
### CURB RAMP DETAIL



# TRUNCATED DOMES CROSS SECTION



TRUNCATED DOMES SPACING



### SECTION A-A

\* SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. THE CONCRETE BORDER SHALL NOT EXCEED 2 INCH PER SIDE.

GENERAL NOTES:

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABLILITES ACT — GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY". EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

SIDEWALK, RAMP AND LANDING CROSS SLOPES SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

30"x 48" CLEAR SPACE SHALL BE PROVIDED CENTERED ON THE PEDESTRIAN PUSH BUTTON.

BEYOND THE BOTTOM GRADE BREAK OF A CURB RAMP, A CLEAR SPACE 4'MINIMUM BY 4'MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.

SIDE FLARES OF CURB RAMPS, IN THE PATH OF PEDESTRIAN TRAVEL (TRAVERSABLE), SHALL NOT EXCEED A SLOPE OF 1V:10H. SIDE FLARES OUTSIDE THE PEDESTRIAN PATH (NONTRAVERSABLE) MAY BE VERTICAL.

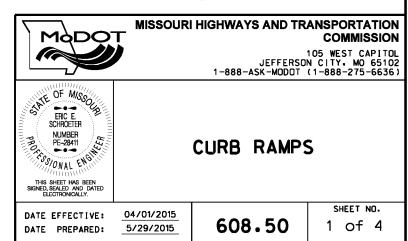
TRANSITION FROM SIDEWALK OR CURB RAMP TO GUTTER TO ROADWAY SHALL BE FLUSH.

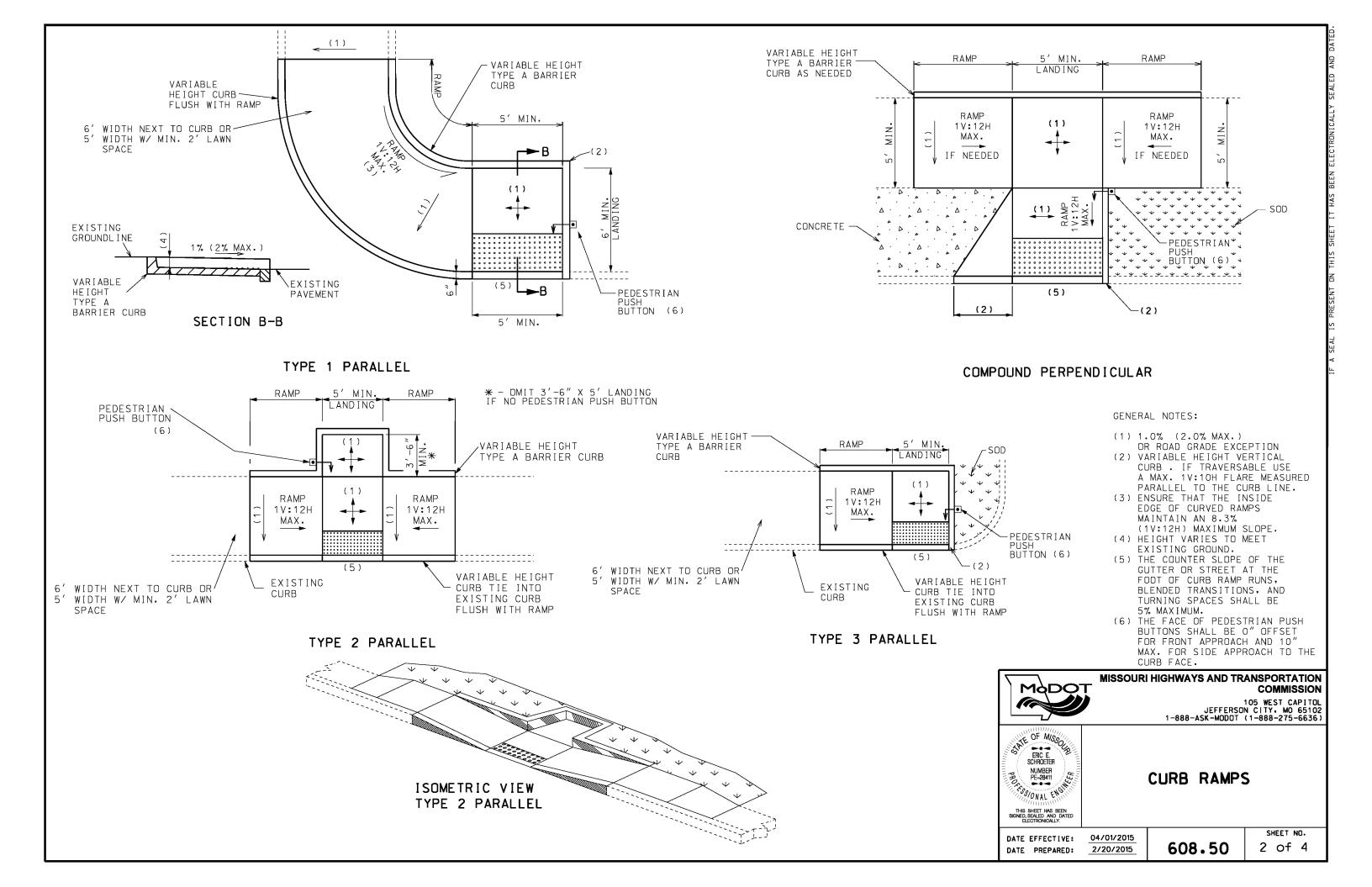
DETECTABLE WARNING SURFACES (TRUNCATED DOMES) SHALL BE PREFORMED AND INSTALLED AS PER MANUFACTURER'S RECOMENDATIONS. STAMPED CONCRETE WILL NOT BE ACCEPTED.

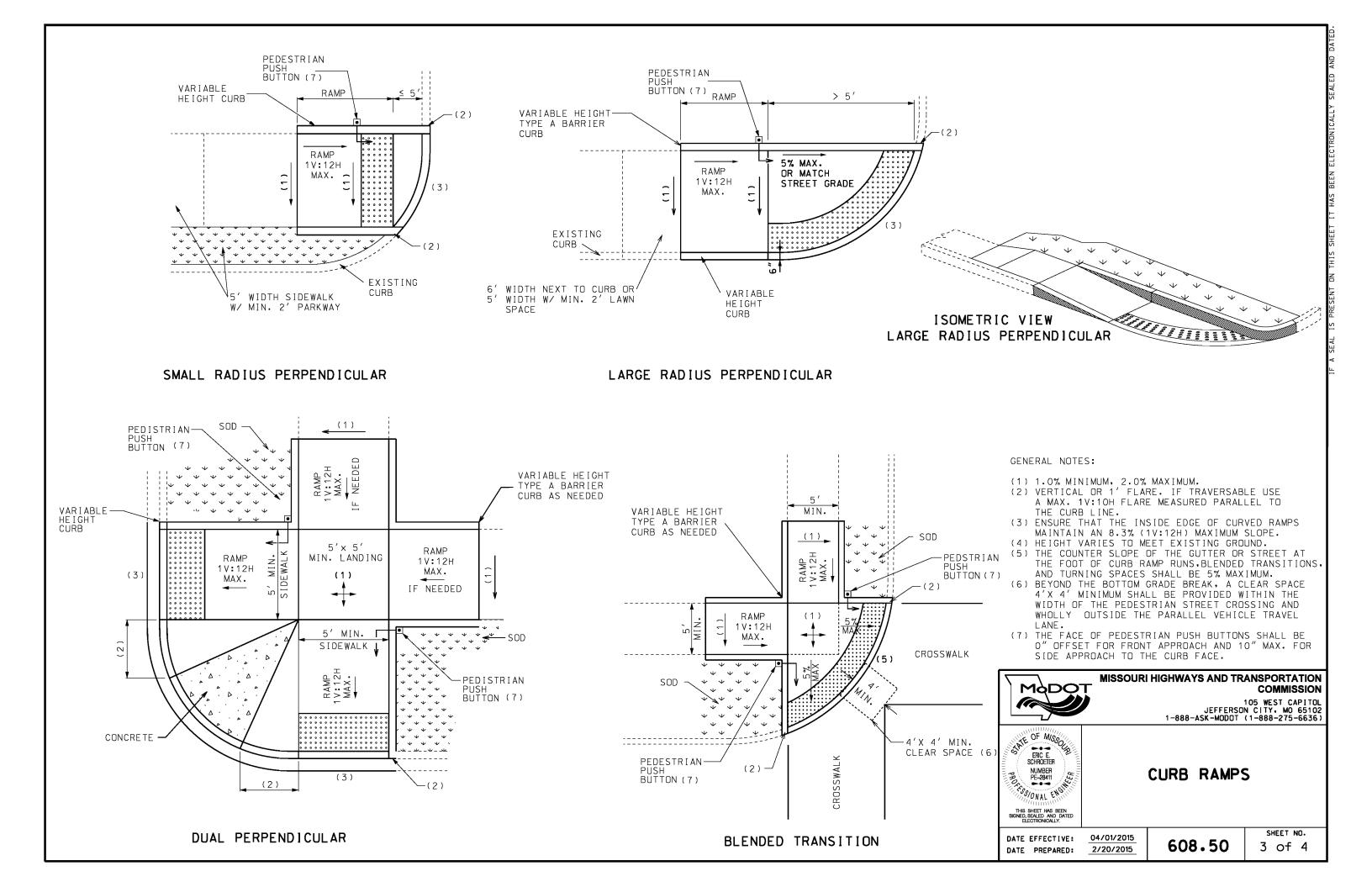
THE DETECTABLE WARNING SURFACE SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT. TRUNCATED DOMES SHALL SPAN THE FULL WIDTH OF THE RAMP OR LANDING 24" DEEP.

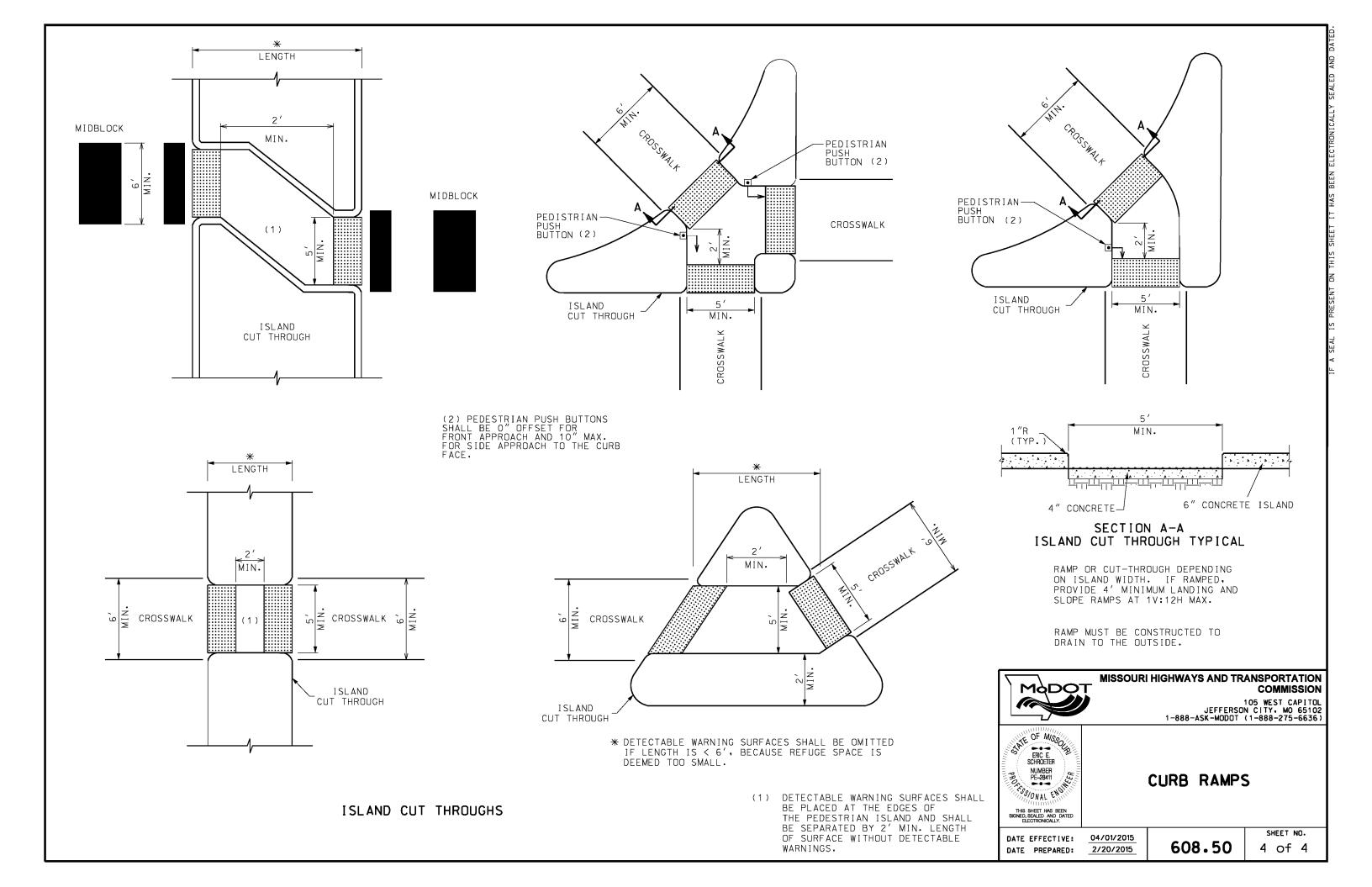
DETECTABLE WARNING SURFACES SHALL BE ALIGNED PERPENDICULAR OR RADIAL TO THE BREAK BETWEEN THE RAMP, LANDING OR BLENDED TRANSITION, AND THE STREET.

WHERE THE BOTTOM GRADE BREAK OF A CURB RAMP IS LESS THAN 5' FROM THE BACK OF CURB, DETECTABLE WARNINGS SHALL BE LOCATED ON THE RAMP SURFACE AT THE BACK OF THE CURB. WHERE THE GRADE BREAK IS GREATER THAN 5' FROM THE BACK OF CURB, THE DETECTABLE WARNING SHALL BE LOCATED ON THE LOWER LANDING.

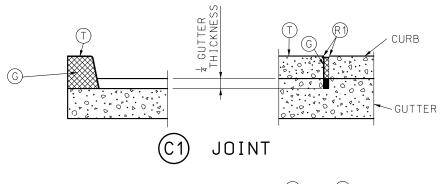


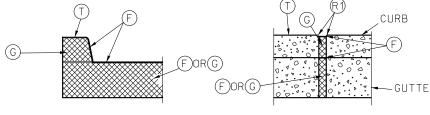




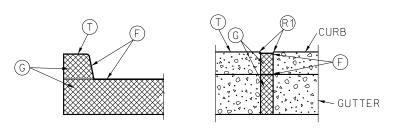


# PLAN OF MEASUREMENT OF CURB & GUTTER AND JOINT PLAN









JOINT

#### LEGEND

- (C) \( \frac{1}{8} \) MAXIMUM WIDTH TRANSVERSE CONTRACTION JOINT (PREFORMED OR SAWED).
- E) 2" TRANSVERSE EXPANSION JOINT. (PREFORMED OR SAWED)
- $\mathbb{C}$   $\frac{1}{2}$  TRANSVERSE EXPANSION JOINT. (PREFORMED OR SAWED)
- (F) FILLER FOR JOINTS HOT POURED.
- (G) PREFORMED JOINT FILLER MATERIAL.
- (K) TONGUE & GROOVE JOINT WITH TIE BAR SEE DETAIL.
- M TONGUE & GROOVE JOINT WITHOUT TIE BARS SEE DETAIL.
- (N) NOT LESS THAN 10' OR MORE THAN 30'.
- (T) TOP OF CURB.
- (R1) ROUND TO  $\frac{1}{4}$ " RADIUS. (EXCEPT FOR SAWED JOINTS)

#### GENERAL NOTES:

A MINIMUM 4" TYPE 1 OR 5 AGGREGATE BASE SHALL BE PLACED BENEATH ALL CURB AND GUTTER SECTIONS AND INCLUDED WITHIN THE MAINLINE BASE PAY LIMITS.

WHEN CURBS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, CURB HEIGHT SHALL BE 4 INCH BARRIER CURB, AS SHOWN ON STANDARD PLAN 606.00.

CURB, GUTTER AND CURB AND CUTTER CONSTRUCTED ALONG AND ATTACHED TO CONCRETE PAVEMENT OR BASE SHALL HAVE:

- 1. JOINT (C1) ONE-QUARTER DEPTH OF CURB AND GUTTER THICKNESS AS A CONTINUATION OF EACH CONTRACTION JOINT IN THE BASE OR PAVEMENT.
- 2. JOINT (E) AS CONTINUATION OF 2" EXPANSION JOINT (E) IN THE CONCRETE BASE OR PAVEMENT SHALL EXTEND AND CONTINUE THROUGH THE CURB, CUTTER AND CURB AND GUTTER.
- 3. JOINT (2) THROUGH CURB AND CURB AND CUTTER AT THE BE-GINNING AND END OF EACH PAVED APPROACH.

CURB, CURB AND GUTTER AND GUTTER CONSTRUCTED APART OR SEPARATED FROM CONCRETE BASE OR PAVEMENT OR AS A FORM FOR ASPHALTIC CONCRETE PAVEMENT SHALL HAVE A JOINT (2) ENTIRELY THROUGH THE CURB, CURB AND GUTTER AND GUTTER, AT THE BEGINNING AND END OF EACH "PAVED APPROACH" AND A JOINT (2) TO 4 DEPTH OF CURB AND GUTTER THICKNESS AT INTERVALS OF 30 FEET BETWEEN APPROACHES,

JOINTS (E) AND (E) THROUGH CURB SHALL BE FILLED WITH PREFORMED FILLER MATERIAL AND SEALED WITH HOT POURED FILLER FOR JOINTS.

JOINT (E1) IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH HOT FILLER MATERIAL.

JOINT (2) IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH FILLER OR FILLED WITH HOT POURED FILLER.

PREFORMED FILLER MATERIAL SHALL BE PLACED TO PROVIDE 1" HOT POURED FILLER FOR JOINTS.

THE BARRIER CLASS CURBS MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6 FEET OR LESS. THE (R2) WILL BE REQUIRED.

WHERE A SIDEWALK INTERSECTS A CURB. THE SIDEWALK SHALL BE RAMPED NO STEEPER THAN 12:1 SLOPE TO PROVIDED ACCESS FOR WHEELCHAIR ACROSS APPROACHES.

PRECAST TYPE A AND B GUTTER ARE ONLY ALLOWED WHEN CONSTRUCTABILITY ISSUES MAKE CAST IN PLACE NOT PRACTICAL. PRECAST IS ONLY ALLOWED WITH THE APPROVAL OF THE ENGINEER. WHEN ALLOWED BY THE ENGINEER, TYPES A AND B GUTTER MAY BE PRECAST TO CONFORM TO THE DIMENSIONS SHOWN. THE PRECASTER SHALL SUBMIT SHOP DRAWINGS INDICATING THE SECTION LENGTH, SECTION CONNECTION, AND PROPOSED JOINT SEALING SYSTEM. WHEN PRECAST SECTIONS CANNOT CONFORM TO ANY VERTICAL OR HORIZONTAL CURVE THEN CAST IN PLACE IS THE ONLY OPTION. A COMBINATION OF CAST IN PLACE AND PRECAST GUTTER MAY BE PERMITTED.

# MODOT

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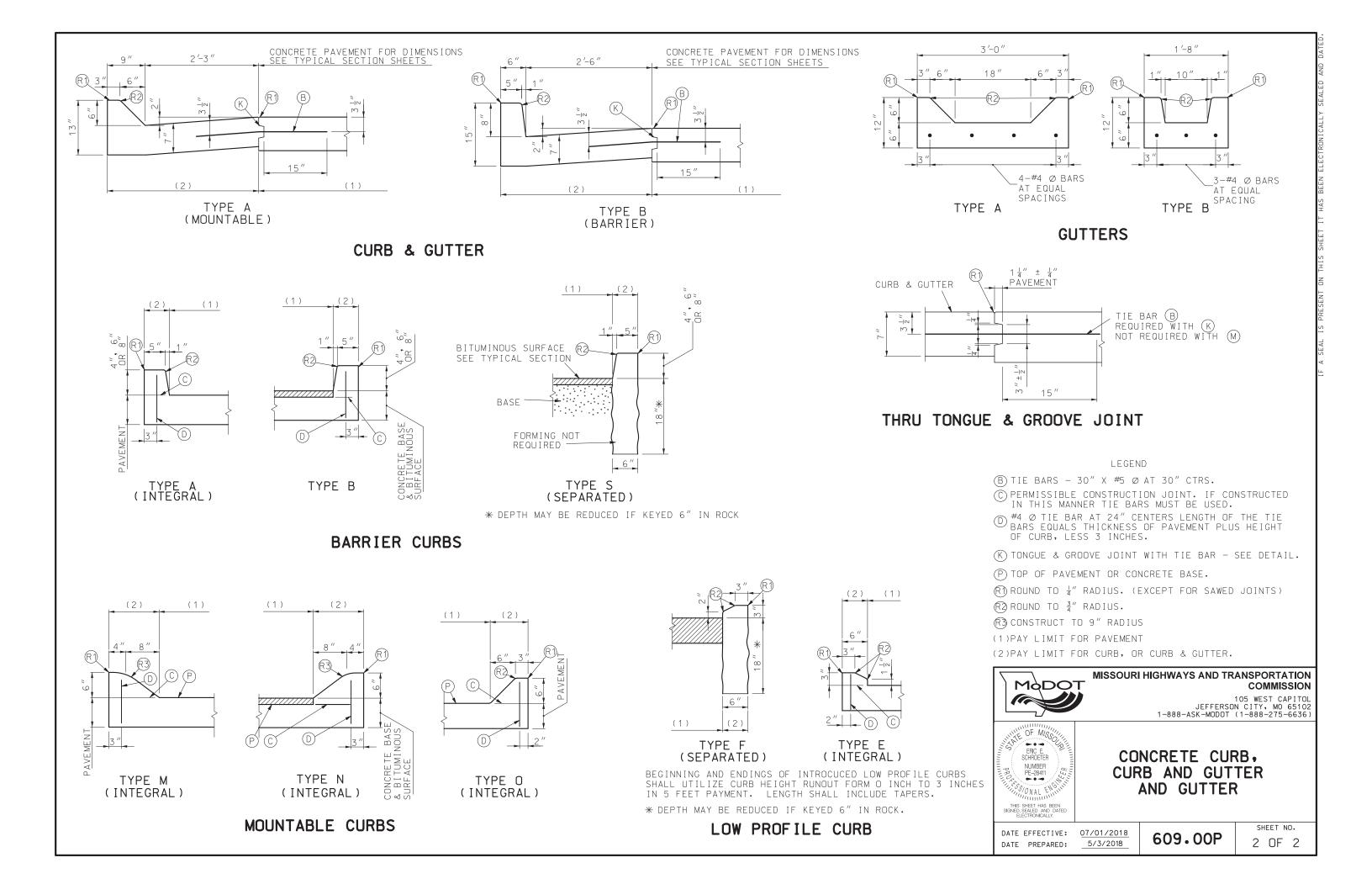


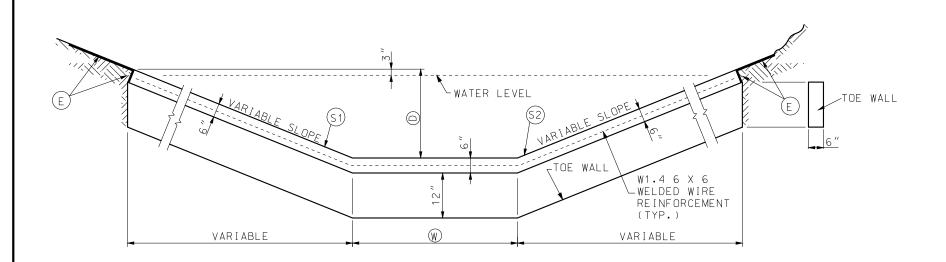
# CONCRETE CURB, **CURB AND GUTTER** AND GUTTER

DATE EFFECTIVE: 04/01/2021 DATE PREPARED:

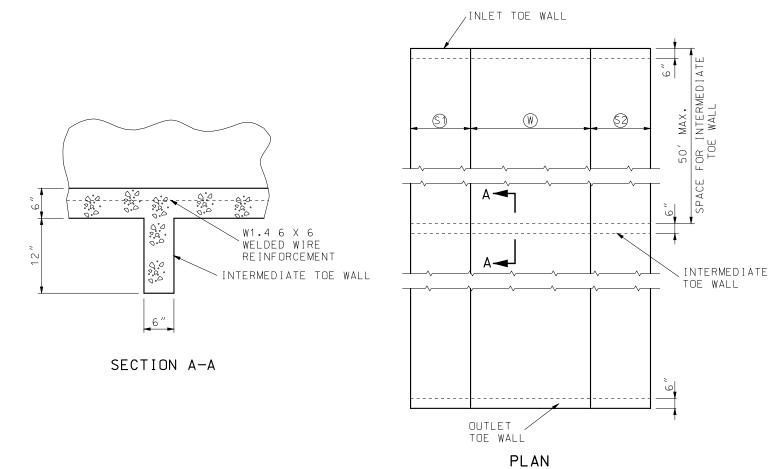
1/27/2021

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# SECTION THROUGH DITCH (SHOWING TOE WALL)



#### LEGEND

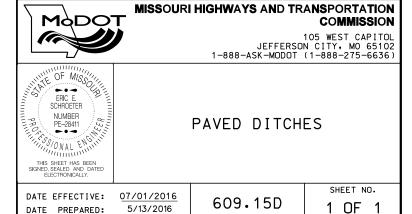
- (D) VERTICAL PAVED DITCH HEIGHT.
- E) SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MAT, IF REQUIRED.
- (\$1) THE WIDTH OF THE STEEPER SIDEWALL OF ALL DITCHES.
- (\$2) THE WIDTH OF THE FLATTER SIDEWALL OF ALL DITCHES.
- (W) THE WIDTH OF THE BOTTOM OF A FLAT BOTTOM DITCH

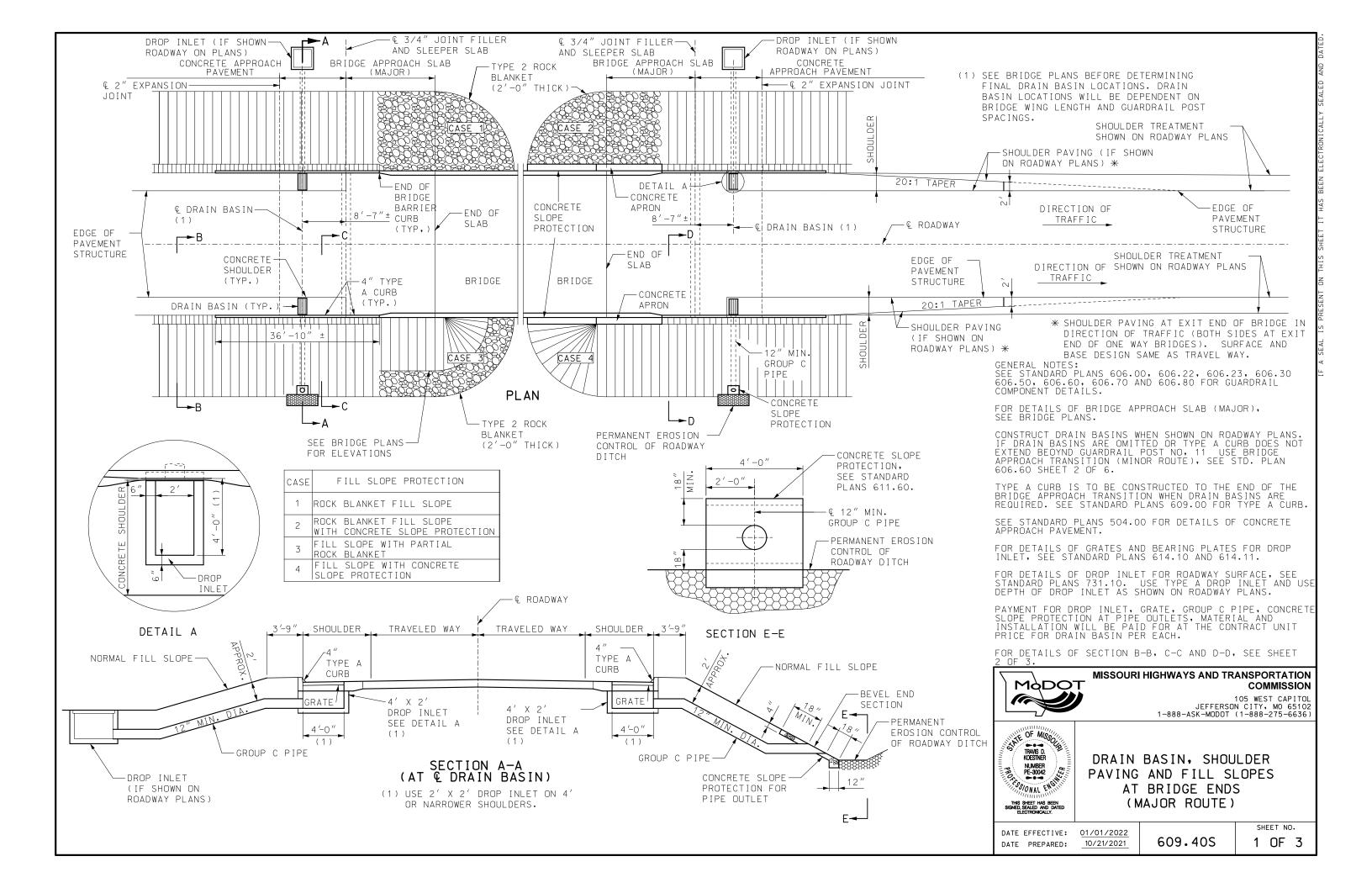
#### GENERAL NOTES:

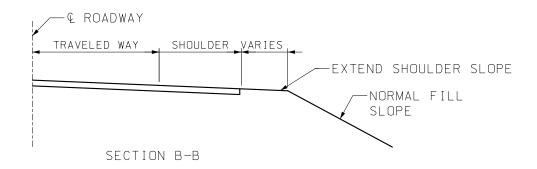
STEEL WELDED WIRE REINFORCEMENT SHALL BE IN ACCORDANCE WITH SEC 1036.3.3.

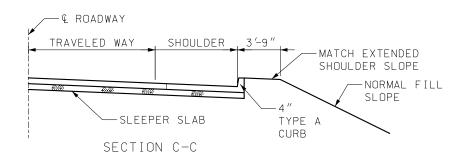
SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MATS SHALL BE USED ALONG THE SIDES IF SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

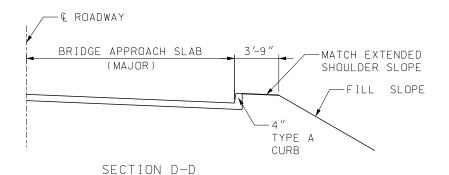
TOE WALLS SHALL BE CONSTRUCTED AT INLET AND OUTLET ENDS OF PAVED DITCHES AND AT 50' MAXIMUM SPACING FOR INTERMEDIATE TOE WALLS.



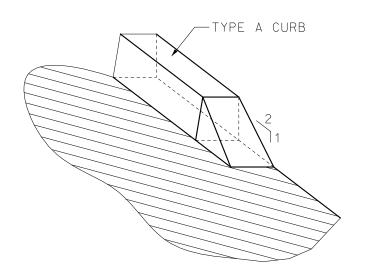








NOTE: FOR DETAILS NOT SHOWN, SEE OTHER SECTIONS.



TYPE A CURB TRANSITION DETAIL

GENERAL NOTE:

FOR LOCATION OF SEC. B-B, C-C AND D-D, SEE SHEET 1 OF 3.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

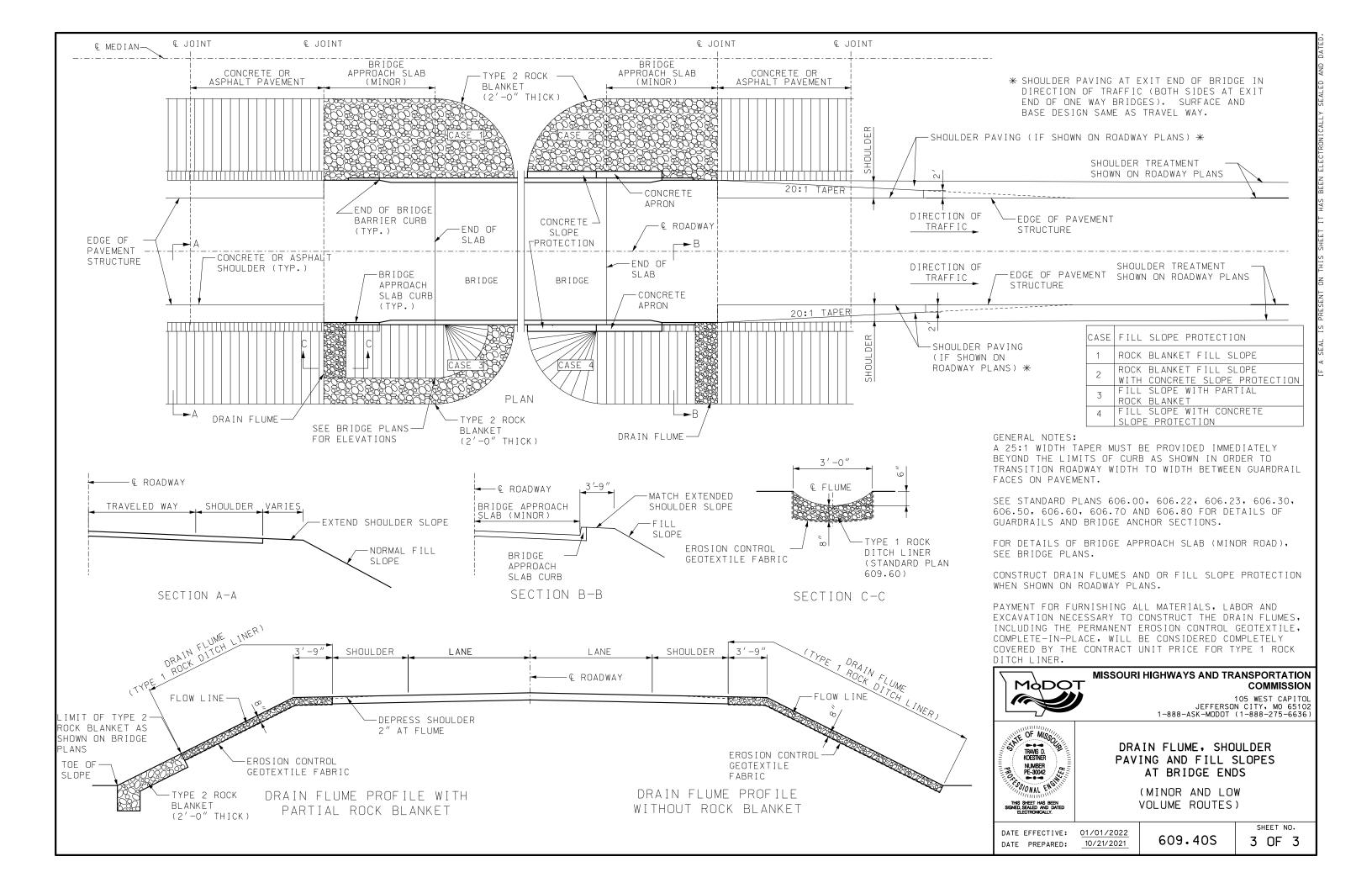
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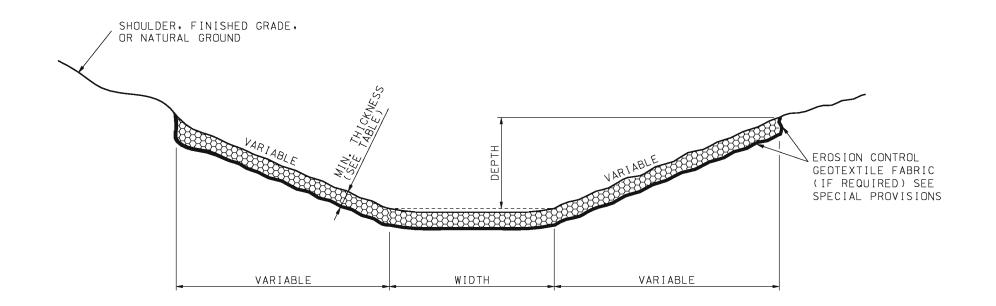


DRAIN BASIN, SHOULDER PAVING AND FILL SLOPE AT BRIDGE ENDS (MAJOR ROUTE)

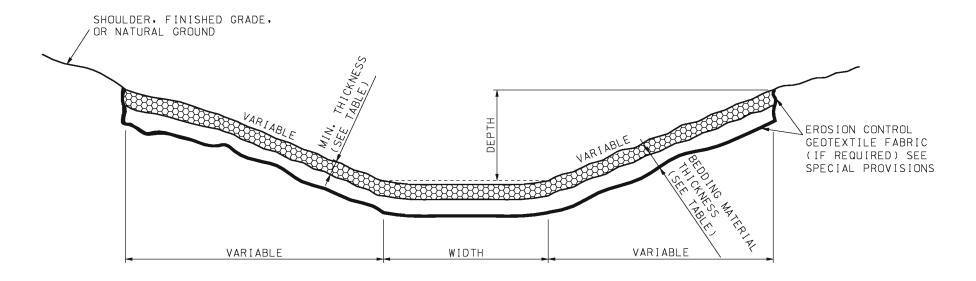
DATE EFFECTIVE: 10/01/2021 DATE PREPARED: 7/13/2021

609.405





### FLAT BOTTOM DITCH WITHOUT BEDDING MATERIAL



FLAT BOTTOM DITCH WITH BEDDING MATERIAL

# TYPICAL DITCH LINER DETAILS

TYPE	ROCK DITCH LINER MIN. THICKNESS	BEDDING MATERIAL MIN. THICKNESS
1	8 "	
2	12"	
3	22"	8 "
4	30"	12"



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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ROCK DITCH LINER

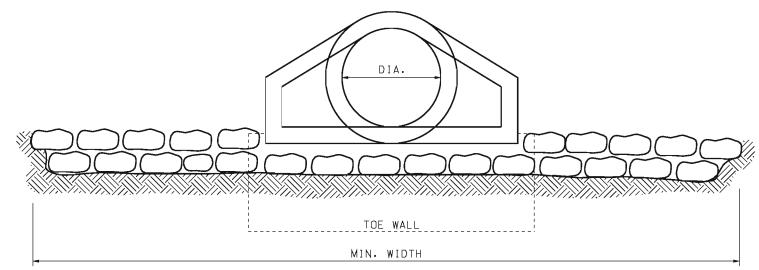
DATE EFFECTIVE: 03/01/1993 DATE PREPARED:

8/21/2009

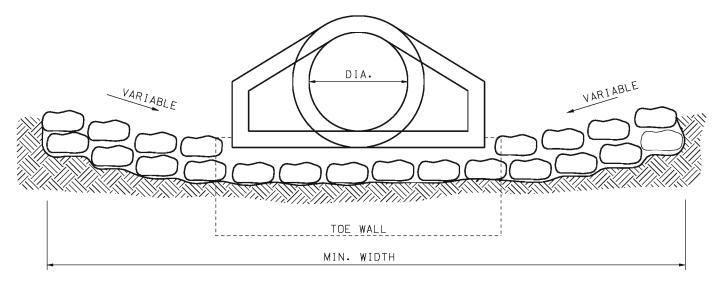
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SHEET NO.

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END VIEW (ALTERNATE METHOD)

ROCK LINING FOR CULVERT OUTLETS							
CULVERT SIZE, DIA (IN.)	MINIMUN DEPTH AND WIDTH (FT.)	MINIMUM LENGHT (FT.)	LINING (CU.YD.)		EQUIVALENT CONCRETE BOX CULVERT (APPROX.)		
18	1 X 4 1 X 6	12	3		2' X 1½'		
30	1 X 7	16	4	B-5	2' X 2'		
36	1.5 X 9	18	9	B-6	3' X 2'		
42	2 X 10	20	15	B-7	3′ X 3′		
48	2 X 12	20	18	B-8	4' X 3'		
54	2 X 13.5	22	22	B-9	4' X 4'		
60	2 X 15	25	28	B-10	5′ X 4′		
66	2 X 18	25	33	B-11	5′ X 5′		
72	2 X 20	30	44	B-12	5′ X 6′		
84	2.5 X 25	35	81		6′ X 6′		
96	2.5 X 30	40	111		7′ X 7′		
108	3 X 32	40	142		8' X 8'		

GENERAL NOTES:

THE DIMENSIONS SHOWN IN THE TABLE CAN BE APPLIED TO BOX OR ARCH CULVERTS OF EQUIVALENT WATERWAY AREA.



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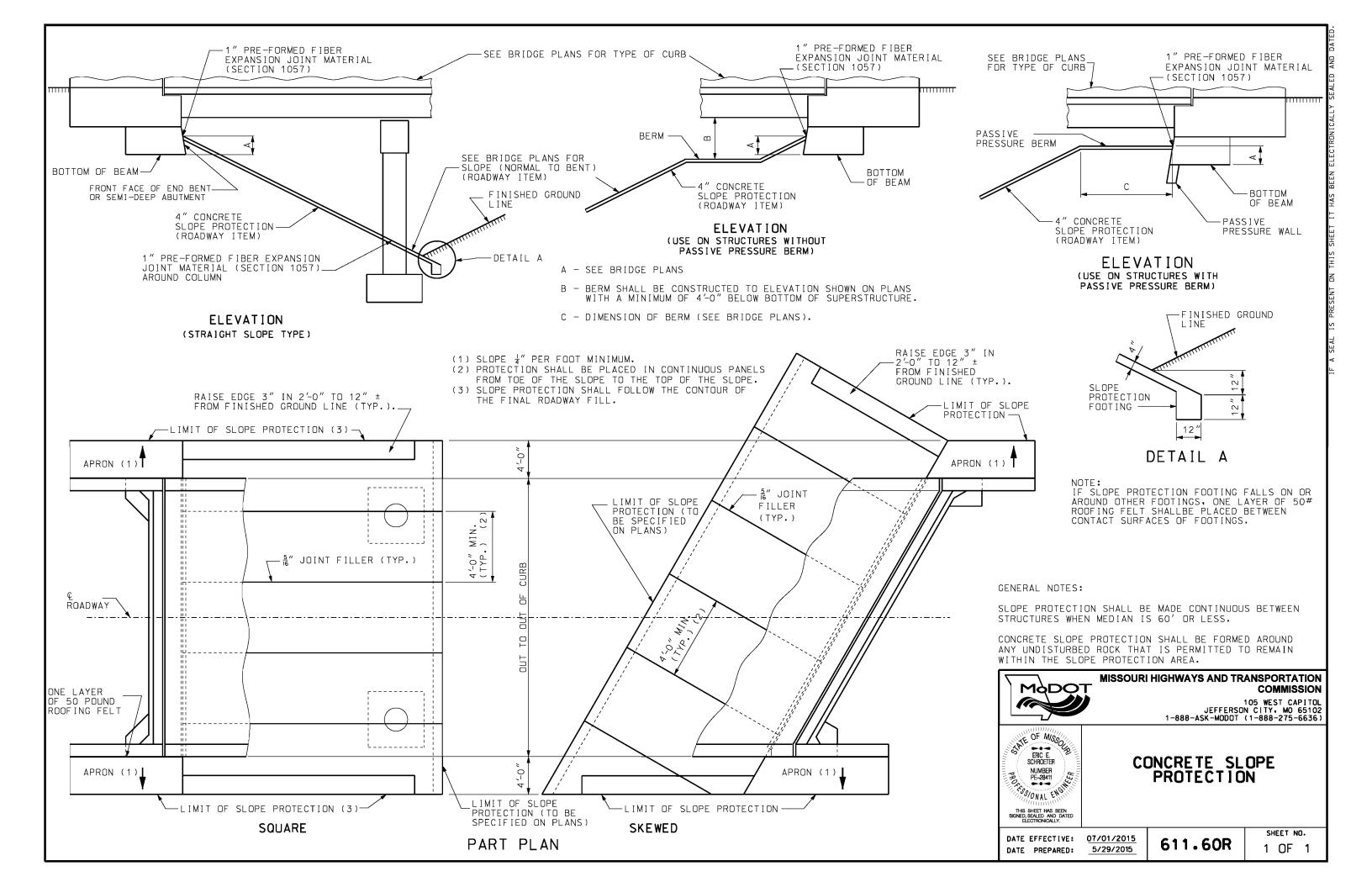
ROCK LINING FOR CULVERT OUTLET

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/01/1981
DATE PREPARED: 8/21/2009

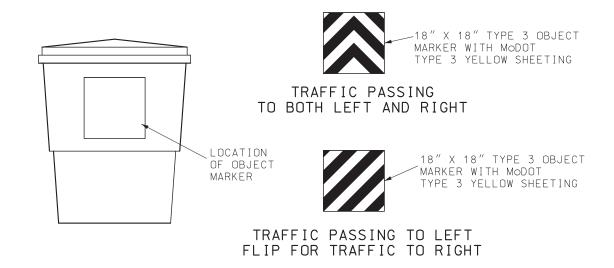
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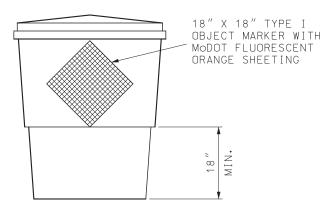


# ATTENUATOR LAYOUT:

ALL SAND FILLED ATTENUATORS SHOULD MEET MANUFACTURER'S RECOMMENDATIONS FOR THE ARRAY AND SAND WEIGHT.



TYPE 3 OBJECT MARKER PLACEMENT FOR PERMANENT INSTALLATIONS



TYPE I OBJECT MARKER PLACEMENT FOR TEMPORARY INSTALLATIONS

GENERAL NOTES:

OBJECT MARKERS SHALL BE CENTERED VERTICALLY OR PLACED AS DIRECTED BY THE ENGINEER.



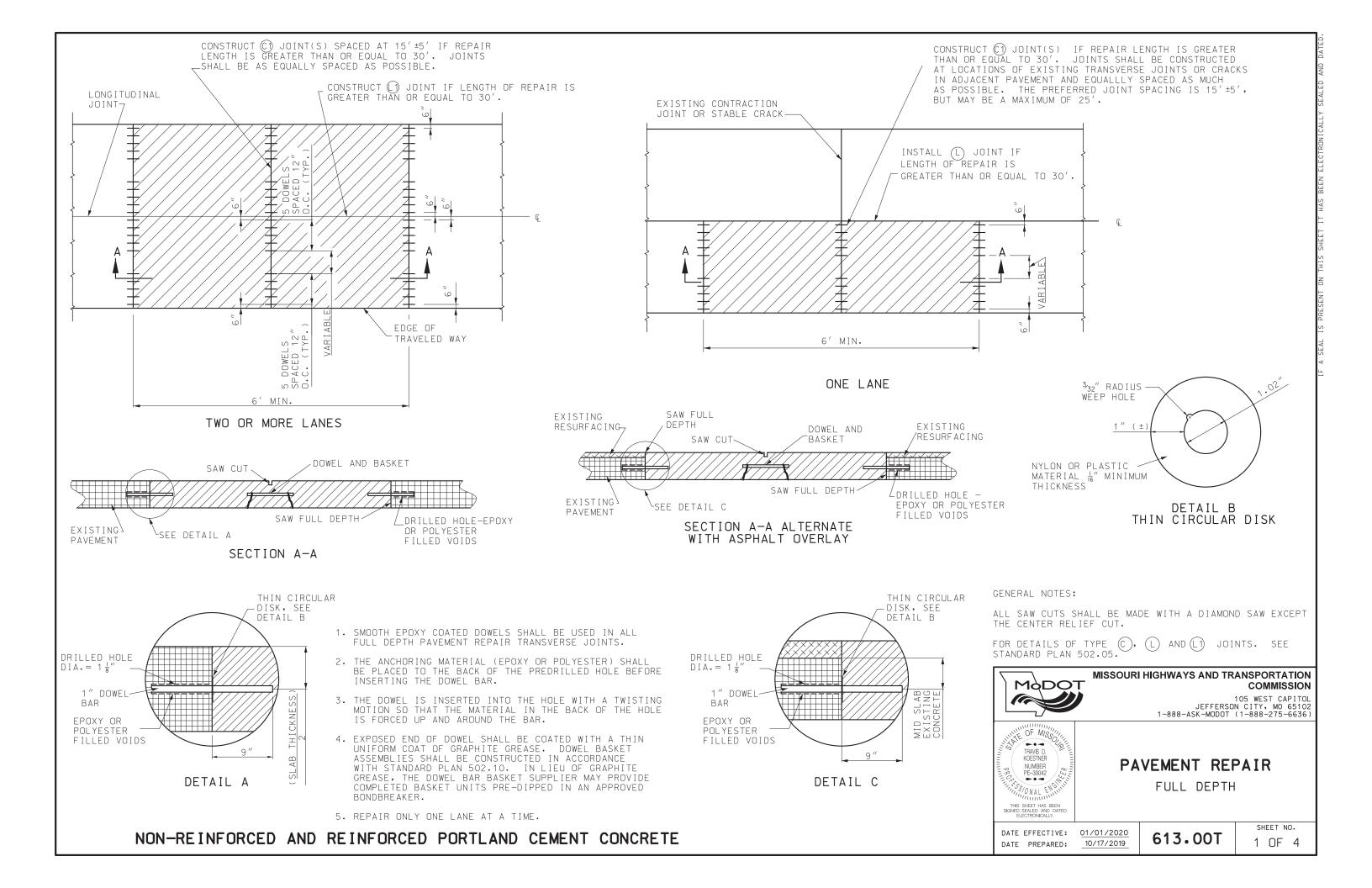
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

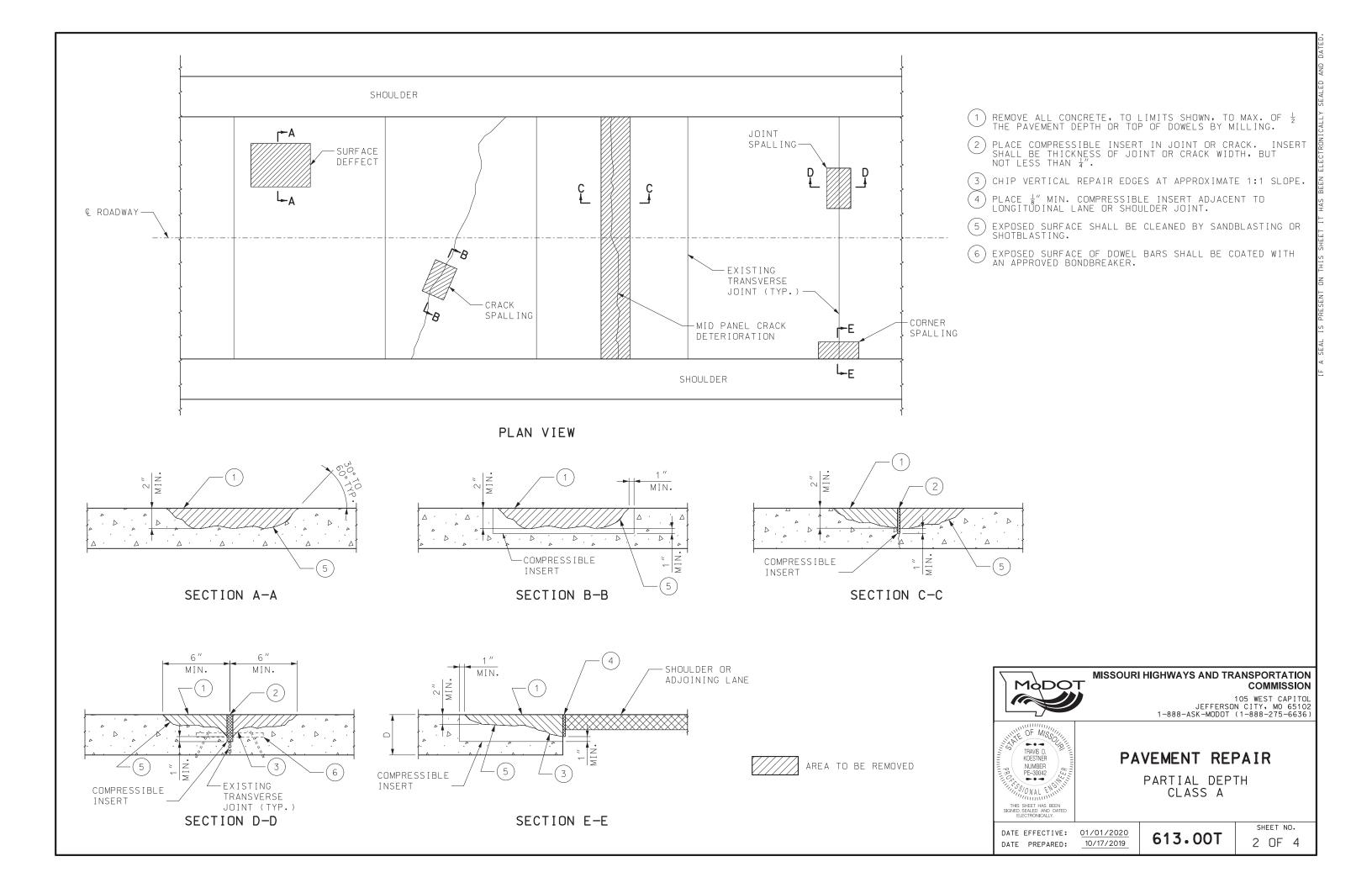


SAND FILLED IMPACT ATTENUATORS

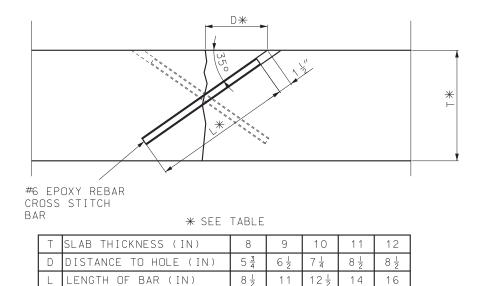
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612.20E





# CROSS STITCHING PLAN



SECTION A-A

#### GENERAL NOTES:

AT EACH REPAIR LOCATION, HOLES SHALL BE DRILLED AT 35° ANGLES TO THE PAVEMENT SURFACE, PERPENDICULAR TO THE CRACK. THE DRILL BIT DIAMETER SHALL NOT EXCEED  $1\frac{1}{8}''$ .

DRILLING SHALL ALTERNATE BACK AND FORTH ON EITHER SIDE OF THE LONGITUDINAL JOINT FROM HOLE TO HOLE.

DRILLED HOLES SHALL NOT PENETRATE THROUGH THE SLAB BOTTOM.

DRILLED HOLES SHALL BE CLEANED OF LOOSE DEBRIS AND DUST, EPOXY OR POLYESTER BONDING AGENTS FOR DOWELS, MEETING THE MATERIAL REQUIREMENTS OF SECTION 1039, SHALL BE INJECTED OR POURED INTO EACH HOLE. A CROSS STITCH BAR SHALL BE INSERTED IN EACH HOLE SUCH THAT THE EPOXY MATERIAL IS EVENLY DISTRIBUTED AROUND THE BAR AND EXTRUDING FROM THE SURFACE OPENING. EACH BAR SHALL BE INSERTED FAR ENOUGH TO ALLOW  $1\frac{1}{2}''$  OF COVER AS SHOWN IN THE PROFILE DETAIL.

THE SURFACE SHALL HAVE ALL EXCESS EPOXY REMOVED AND HAVE A FLUSH FINISH. GENERAL NOTES:

# MODOT

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# PAVEMENT REPAIR

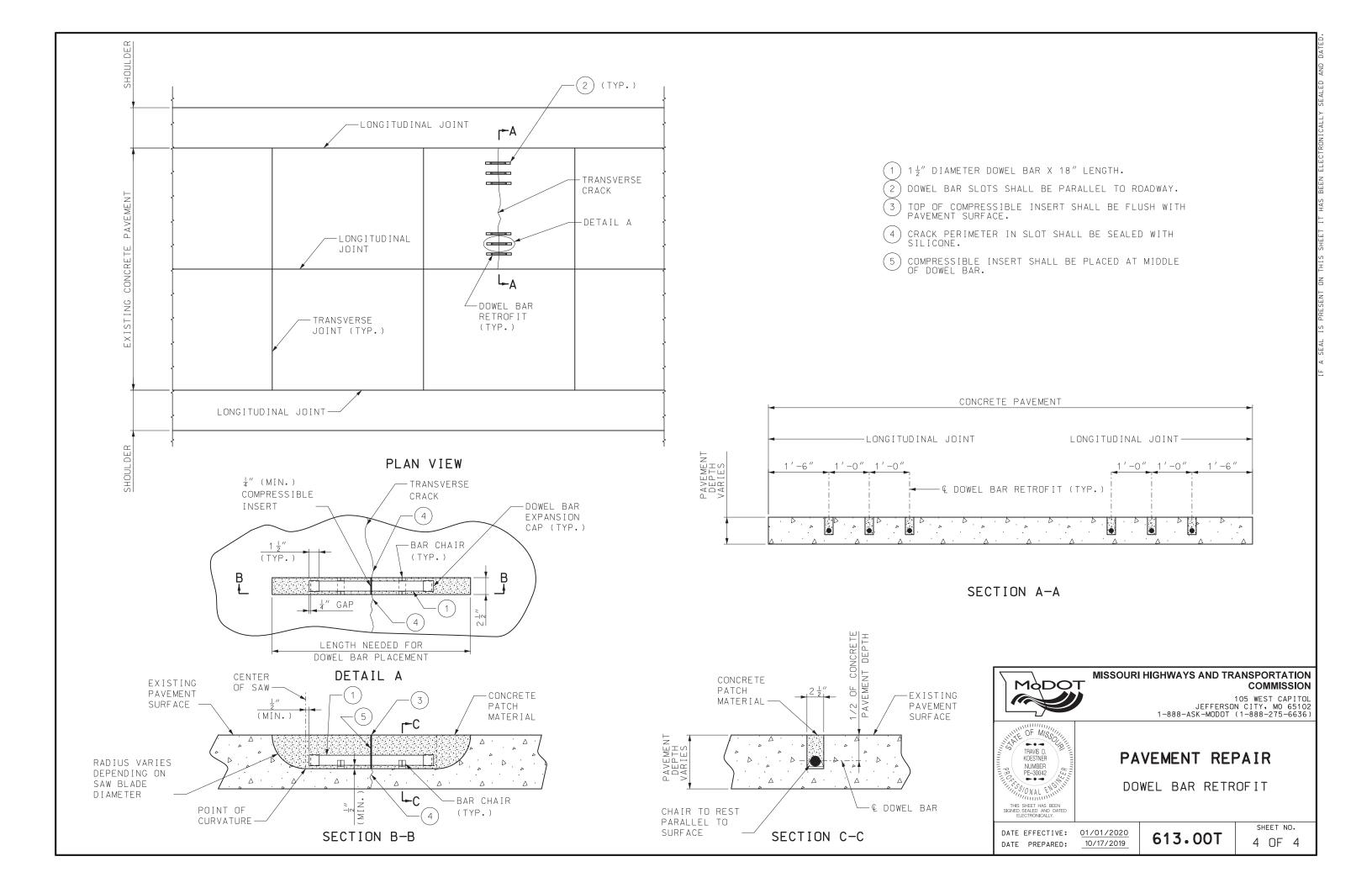
CROSS STITCHING

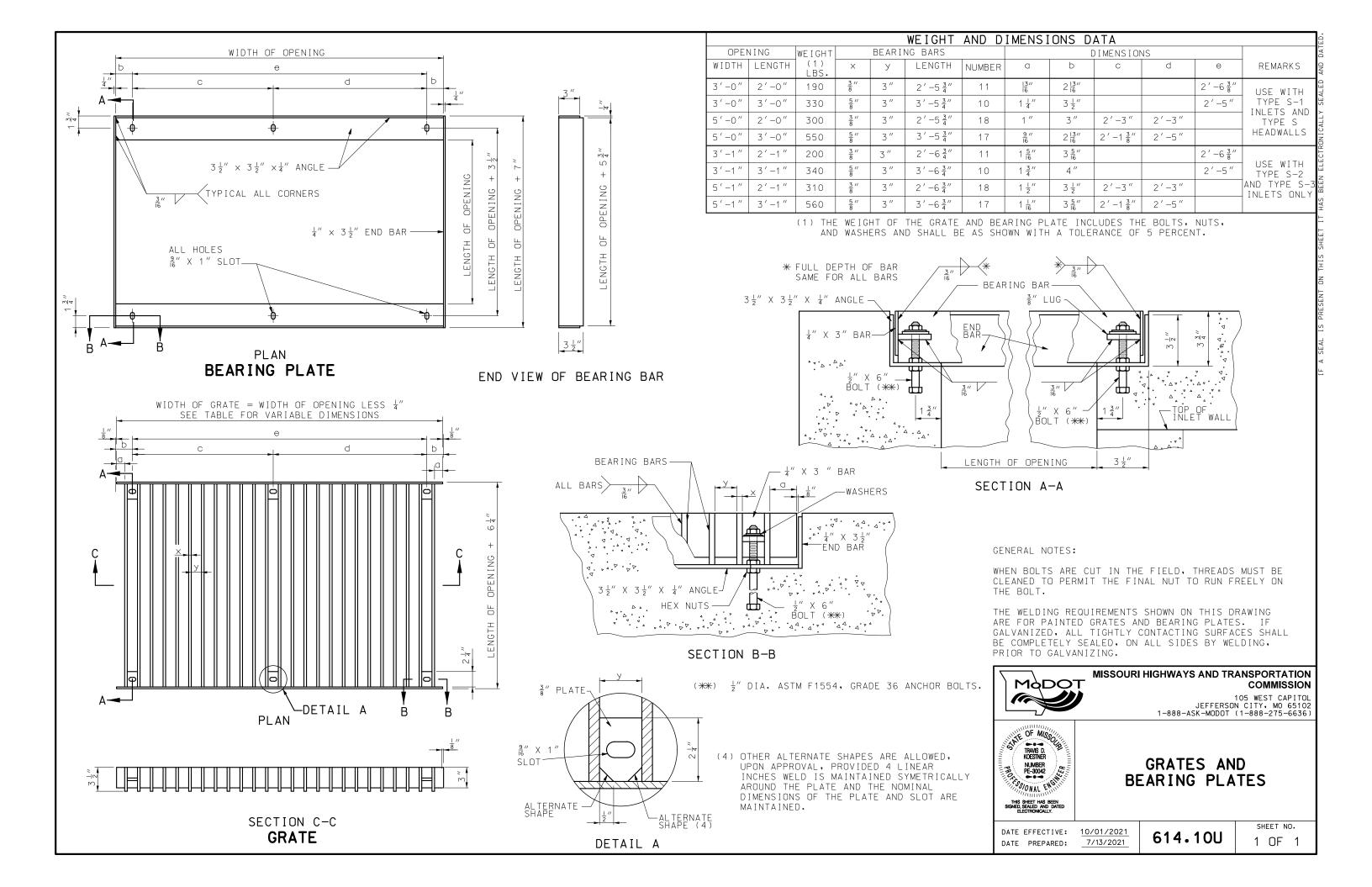
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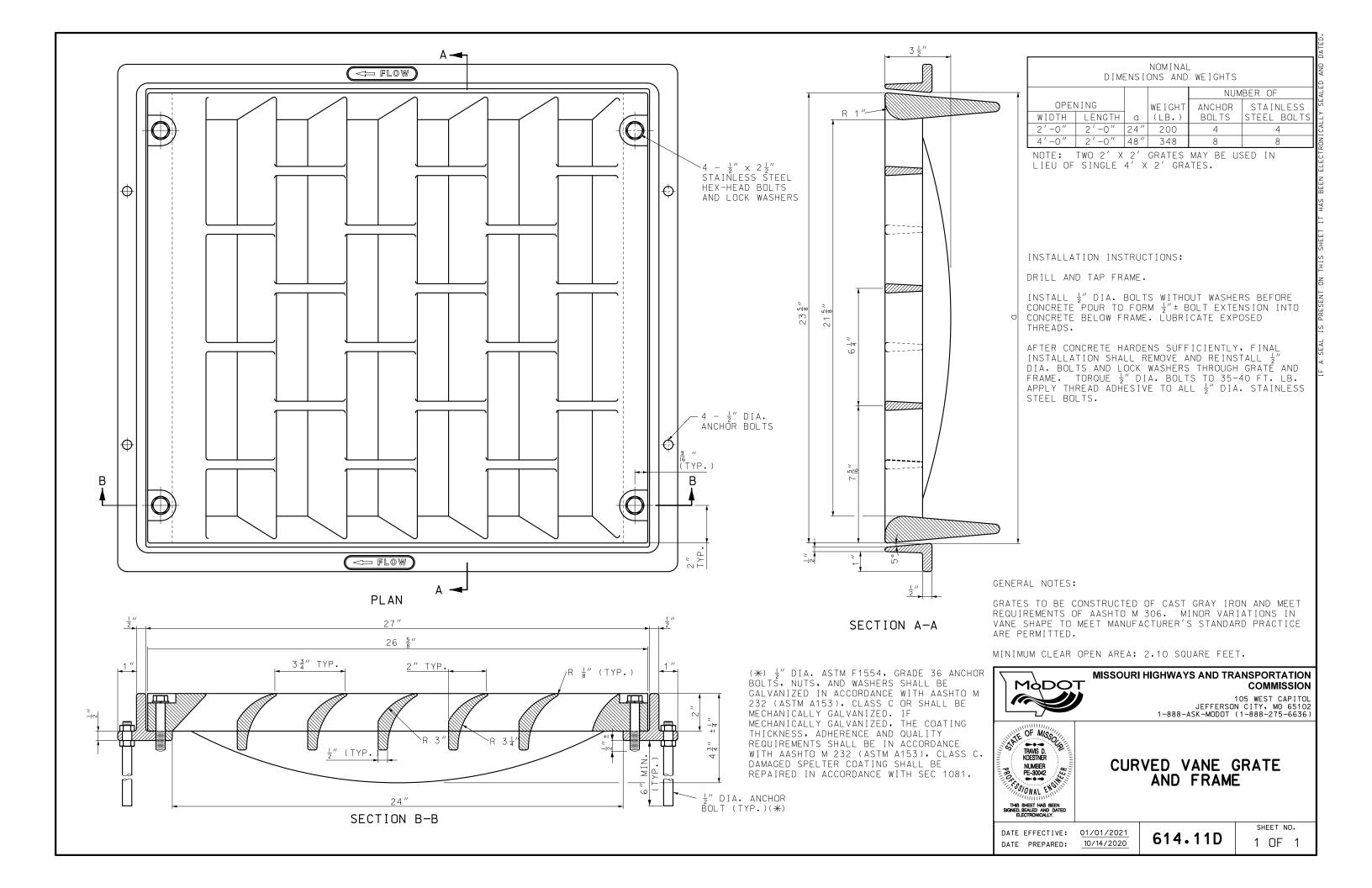
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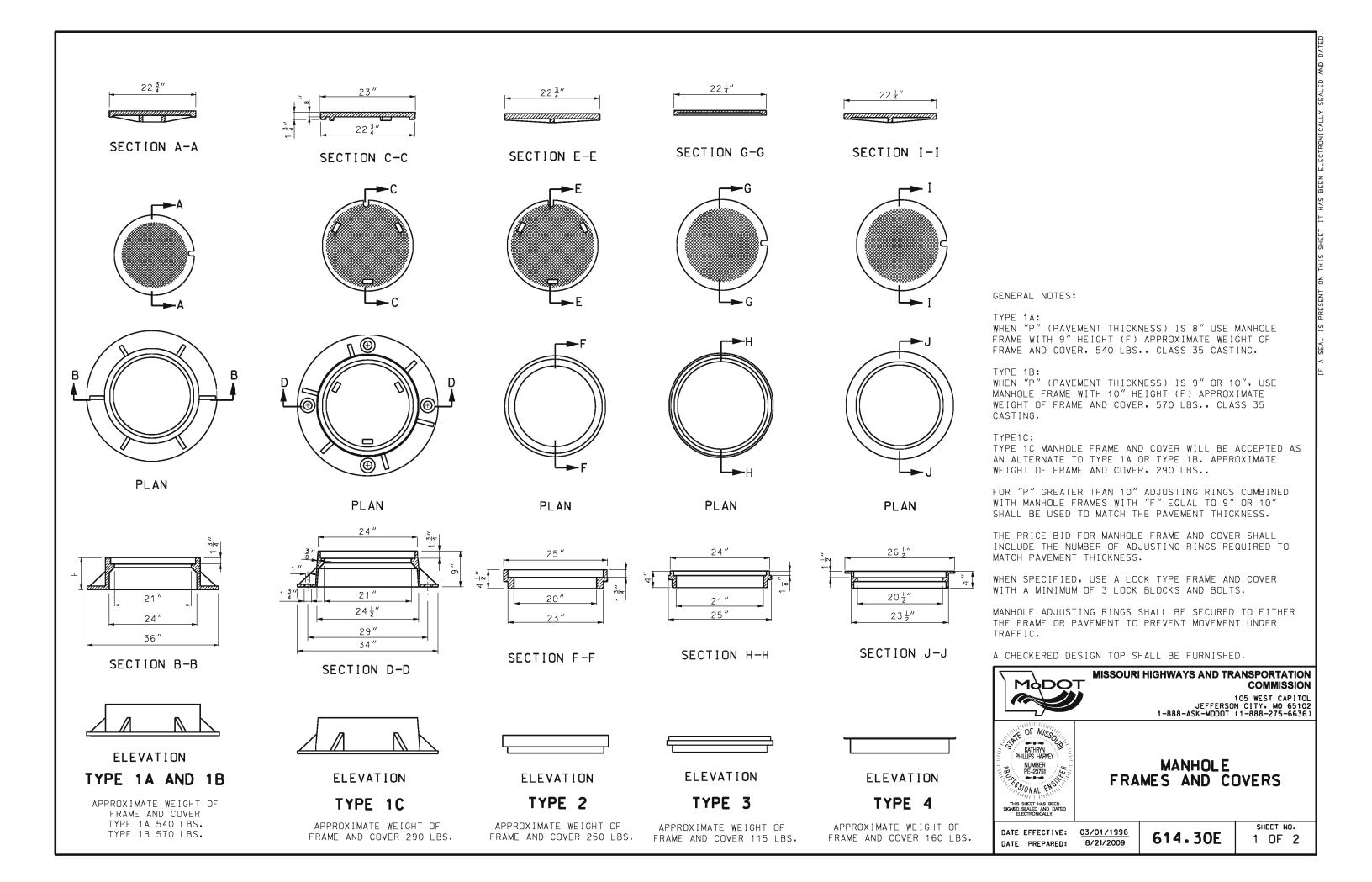
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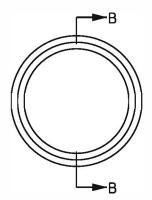
3 OF 4



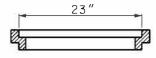




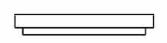




PLAN



SECTION B-B



ELEVATION

ADJUSTING RING

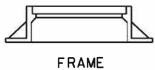
SOLID OR ADJUSTABLE



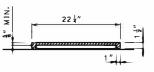
COVER



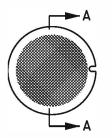
ADJUSTING RING



INSTALLATION DETAILS



SECTION A-A



APPROXIMATE WEIGHT OF FRAME AND COVER 150 LBS.

ALTERNATE TYPE 4 COVER



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MANHOLE FRAMES AND COVERS

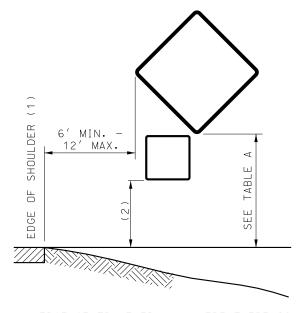
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DATE PREPARED: 8/21/2009

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# TABLE A WORK ZONE SIGN MOUNTING REQUIREMENTS

TYPE	SIGN SUPPORT	SIGN SUBSTRATE	MINIMUM MOUNTING HEIGHT(3)	USAGE LIMITATIONS	COMMENTS
POST	PERFORATED SQUARE STEEL TUBE U-CHANNEL WOOD	RIGID	5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS	NONE	POSTS SHALL BE FREE OF ANY BRACING AND EXTEND NO FURTHER ABOVE THE SIGN EXCEPT AS NEEDED FOR WARNING LIGHT ATTACHMENT, FOR DETAILS OF POST INSTALLATION DETAILS SEE SHEET NO, 2 OF 9, GALVANIZATION OF POSTS WILL NOT BE REQUIRED.
TYPE 1 PORTABLE	SKID FOLD-UP STAND	RIGID	5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS	PERMITTED ONLY WHERE POST MOUNTING IS NOT FEASIBLE.	SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 TEST LEVEL 3 AND MAY BE PLACED ADJACENT TO OR WITHIN THE ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONT-ALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF DESIGNATED TRAVELED WAY, IS MAINTAINED.
TYPE 2 PORTABLE	EASEL FOLD-UP STAND SELF-DRIVING POST TYPE III MOVABLE BARRICADE SKID	FLEXIBLE RIGID	12"(4)	PERMITTED ONLY FOR INSTALLATION UP TO 3 DAYS(5). WHERE SIGNS ARE OBSCURED BY OTHER OBJECTS (I.E., TRAFFIC CONTROL DEVICES, PARKED VEHICLES, BARRIER, VEGETATION, ETC.) OR INSTALLED ON MULTI-LANE UNDIVIDED FACILITIES OR MULTI-LANE DIVIDED FACILITIES WITH 3 OR MORE LANES IN ONE DIRECTION, MOUNTING HEIGHTS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.	SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 TEST LEVEL 3 AND MAY BE PLACE ADJACENT TO OR WITHIN ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONT-ALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF THE DESIGNATED TRAVELED WAY, IS MAINTAINED.
BARRIER	CONCRETE TRAFFIC BARRIER GUARDRAIL	FLEXIBLE RIGID	5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS	PERMITTED ONLY WHERE LONGITUDINAL BARRIER IS PRESENT.	SYSTEMS SHALL PROVIDE POSITIVE CON- NECTION TO THE BARRIER AND MINIMIZE POTENTIAL FOR VEHICLE SNAGGING.
VEHICLE	PAVEMENT MARKING EQUIPMENT PILOT CAR PROTECTIVE VEHICLE	FLEXIBLE RIGID	48" (6)	PERMITTED ONLY IN PILOT CAR OR MOVING OPERATIONS.	

- (3) MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF THE PAVEMENT.
- (4) MOUNTING HEIGHTS FOR REGULATORY AND GUIDE SIGNS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.
- (5) SIGNS MOUNTED ON TYPE III BARRICADES, GORE EXIT SIGN, AND SIGNS FOR CROSWALK/SIDEWALKCLOSURES MAY BE LEFT IN PLACE FOR MORE THAN 3 DAYS.
- (6) DEVIATIONS AS APPROVED BY THE ENGINEER.



- (1) EDGE OF TRAVELED WAY WHERE THERE IS NO PAVED OR STABILIZED SHOULDER. (2) ONE-FOOT LESS THAN MOUNTING HEIGHT
- NOTED IN TABLE A.

MIN. 

HEIGHT AND LATERAL LOCATIONS FOR POST AND PORTABLE SIGN MOUNTING

#### GENERAL NOTES:

LONGITUDINAL SPACING OF SIGNS SHOWN IN THE PLANS ARE PREFERRED MINIMUMS, BUT MAY BE ADJUSTED TO MEET EXISTING FIELD CONDITIONS WITH APPROVAL FROM THE

SIGNS SHALL NOT BE MOUNTED IN OR ON CHANNELIZERS.

ALL POSTS AND SIGNS SHALL BE INSTALLED AND MAINTAINED IN A PLUMB POSITION.

CONSTRUCTION SIGNS SHALL NOT BE LOCATED ON SIDEWALKS BICYCLE LANES, OR AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE TRAFFIC.



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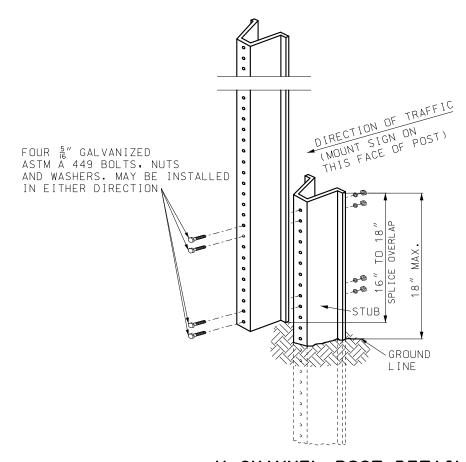


TEMPORARY TRAFFIC CONTROL DEVICES SIGN MOUNTING REQUIREMENTS

DATE EFFECTIVE: 10/01/2021 DATE PREPARED:

7/13/2021

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USE OF SPLICE IS OPTIONAL.

SPLICE OVERLAP SHALL BE POSITION ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

\* IF A PLAQUE IS USED, NEITHER THE SIGN NOR PLAQUE SHALL BE POSITIONED WITHIN THE SPLICE OVERLAP AREA.

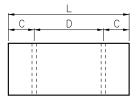
ONLY ONE SPLICE WILL BE ALLOWED PER POST.

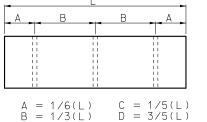
		1001 1112		Δ
SIGN AREA (SQ.FT.)	U-CHANNEL	WOOD	PERFORATED SQUARE STEEL TUBING	AND
≤ 10	1 - 3.0 LB./FT.	1 - 4" X 4"*	1 - 2" 12 GA*	' SEALED
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4" 1 - 4" X 6"*	2 - 2'' 12 GA. $1 - 2\frac{1}{2}'' 12 GA.$	BEEN ELECTRONICALLY
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"	3 - 2" 12 GA**	LECTRO
> 24 ≤ 32	3 - 3.0 LB./FT.	2 - 4" X 6"	N/A	BEEN E
> 30 ≤ 50	N/A	2 - 6" X 6"	N/A	T HAS

POST TYPE

\* SIGNS GREATER THAN 4 FEET IN WIDTH, EXCEPT DIAMOND SHAPE SIGNS, REQUIRE TWO POSTS.

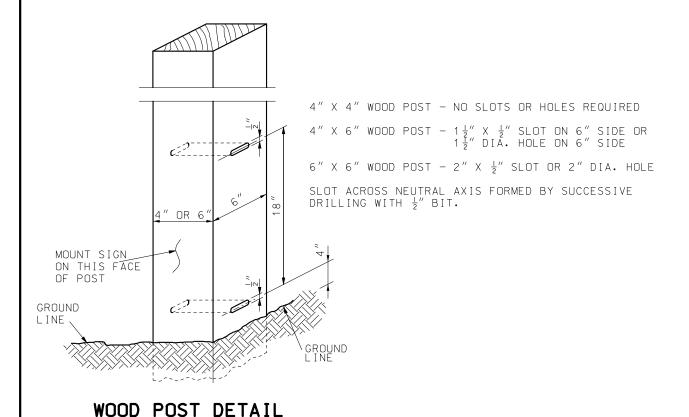
\*\* REQUIRES SLIP BASE PER MANUFACTURER'S RECOMMENDATION.

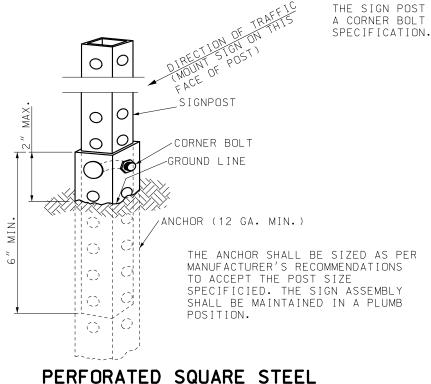




POST SPACING

U-CHANNEL POST DETAIL





TUBE POST DETAIL

THE SIGN POST MAY BE ATTACHED TO THE ANCHOR WITH A CORNER BOLT OR STRAIGHT BOLT PER MANUFACTURER'S

GENERAL NOTES:

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET.

SIGN INSTALLATION DETAILS SHOWN SHALL APPLY TO ALL POSTS IN A MULTI-POST INSTALLATION.

AT THE ENGINEERS DISCRETION A FLUORESCENT PAINT SHALL BE APPLIED HEAVILY TO BOTH SIDES OF U-CHANNEL POST STUB FOR A LENGTH OF AT LEAST 6 INCHES BELOW THE TOP OF THE STUB.



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## **TEMPORARY** TRAFFIC CONTROL DEVICES POST INSTALLATION DETAILS

DATE PREPARED:

DATE EFFECTIVE: 10/01/2021 7/13/2021

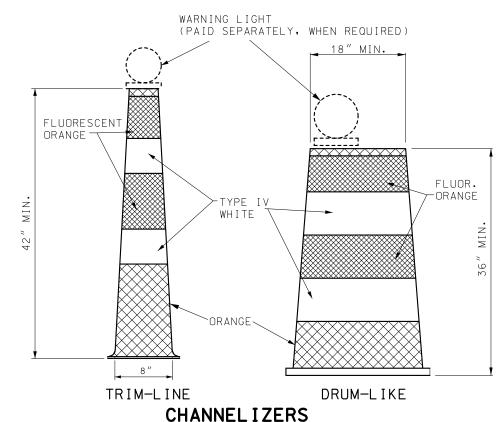
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## DIRECTION INDICATOR BARRICADE

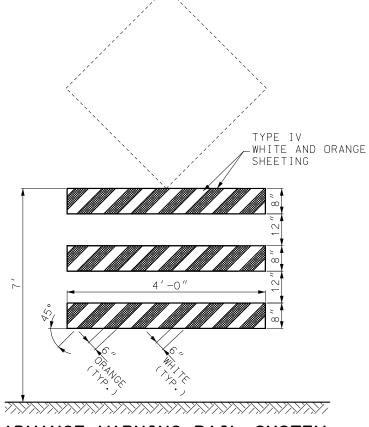
VERTICAL DIMENSIONS DO NOT INCLUDE PROJECTIONS DESIGNED FOR EASE OF HANDLING.

DIRECTION INDICATOR BARRICADES SHALL NOT BE USED IN SHIFTING TAPERS UNLESS SHOWN ON THE PLANS.

THE PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.



WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.



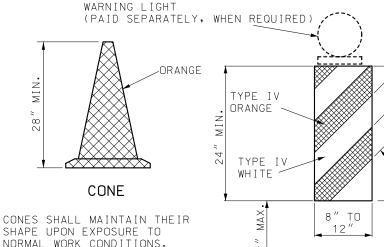
## ADVANCE WARNING RAIL SYSTEM

MAXIMUM WEIGHT OF SIGN SHALL NOT EXCEED 25 LBS.

THE SIGN AND RAIL SYSTEM MAY BE MOUNTED AS TWO SEPARATE CRASHWORTHY DEVICES. THE RAIL SYSTEM SHALL BE LOCATED DIRECTLY IN FRONT OF THE SIGN WITH 7 TO 10 FEET SEPARATING THE TWO DEVICES.

WHERE MARKING IS NOT PROVIDED ON THE BACKSIDE, STRIPS OF  $3^{\prime\prime}$  WIDE MODOT TYPE 7 ORANGE SHEETING MAY BE APPLIED TO THE ENDS OF EACH RAIL TO HELP DELINEATE THE DEVICE.

WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.4.



SHAPE UPON EXPOSURE TO NORMAL WORK CONDITIONS.

CONES SHALL BE USED DURING DAYLIGHT HOURS ONLY.

> VERTICAL PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.

VERTICAL PANEL

GENERAL NOTES:

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.

BALLAST FOR TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUFACTURERS' RECOMMENDATION FOR FIELD CONDITIONS WHEN APPLICABLE.

IF USED, THE WARNING LIGHT UNIT AND BATTERY COMPARTMENT SHALL BE FURNISHED BY THE DEVICE MANUFACTURER OR OTHERWISE MEET THE MANUFACTURER'S RECOMMENDATIONS FOR DESIGN AND WILL BE REQUIRED ON ALL DEVICES IN THE SERIES.

WARNING LIGHTS SHALL BE IN ACCORDANCE WITH SEC 1063.5.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DRUM-LIKE CHANNELIZERS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONG-ITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA WHERE NO RAMPS, INTERSECTIONS OR LIMITED LATERAL CLEARANCE EXISTS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DIRECTION INDICATOR BARRI CADES IN LIEU OF TRIM-LINE CHANNELIZERS IN MERGING TAPERS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE VERTICAL PANELS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONGITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE CONES IN LIEU OF TRIM-LINE CHANNELIZERS DURING DAYTIME OPERATIONS ON MINOR ROUTES.

PANEL AND RAIL MARKINGS FOR TRAFFIC DELINEATION SHALL SLOPE DOWNWARD TOWARD THE INTENDED DIRECTION OF TRAVEL. ILLUSTRATIONS SHOWN ARE FOR INSTANCES WHERE TRAFFIC MOVES TO THE LEFT, REVERSE CONFIGURATIONS SHALL BE USED FOR TRAFFIC MOVEMENTS TO THE RIGHT. MARKINGS SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR PANEL, OR MAY BE APPLIED TO BOTH THE FRONT AND BACK PROVIDING THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.



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**TEMPORARY** TRAFFIC CONTROL DEVICES CHANNELIZERS AND DIRECTION INDICATOR BARRICADE

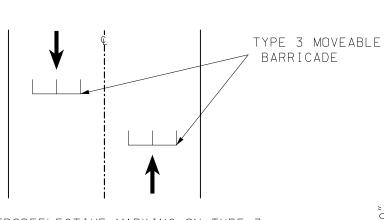
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7/13/2021

SHEET NO.

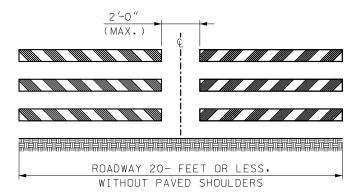
STRIPES ON TRIM-LINE CHANNELIZERS SHALL BE 6" TO 8". STRIPES ON DRUM-LIKE CHANNELIZERS SHALL BE 4" TO 6". 616.10AY

3 OF 9

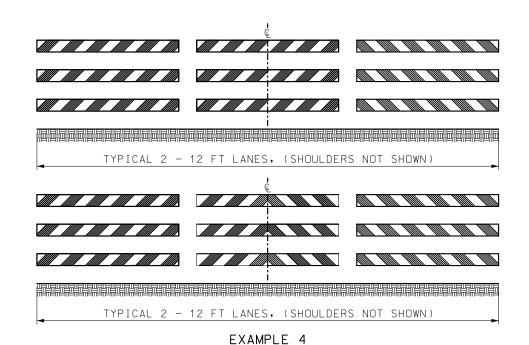


RETROREFLECTIVE MARKING ON TYPE 3 BARRICADES SHALL BE ON BOTH SIDES OF EACH RAIL AND DIRECT TRAFFIC MOVEMENT APPROPRIATELY TO ALLOW VEHICLES TO PASS THROUGH

> SOFT CLOSURE PLAN VIEW

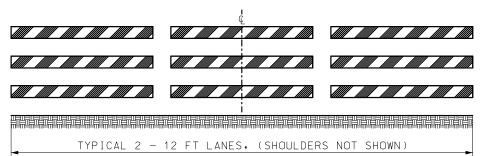


EXAMPLE 2



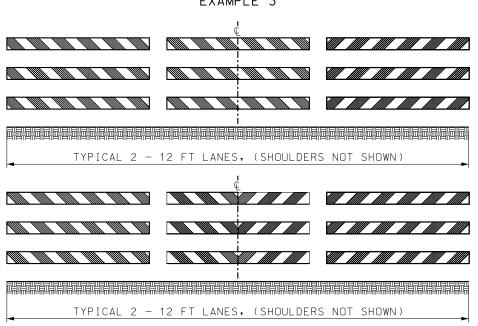
8'-0" -WARNING LIGHTS (PAID SEPARATELY, WHEN REQUIRED) -TYPE IV WHITE  $\Delta$ ND ORANGE SHEETING 6" WIDE 6" WIDE ORANGE WHITE (TYP.) (TYP.

EXAMPLE 1



EXAMPLE SHOWS STRIPES SLOPING TO DIRECT VEHICULAR MOVEMENT TOWARD THE LEFT

EXAMPLE 3



EXAMPLE 5

EXAMPLE 1 - ONE TYPE 3 MOVABLE BARRICADE WILL BE REQUIRED TO COMPLETELY CLOSE EACH 8' OF PAVEMENT. PAVED SHOULDERS SHALL BE INCLUDED IN THE AREA TO BE CLOSED.

SIGNS SHALL BE LIGHT WEIGHT (ROLL-UP OR PLASTIC) AND SHOULD NOT OBSCURE MORE THAN 50 PERCENT OF THE TOP 2 RAILS OR 33 PERCENT OF ALL THREE RAILS.

WARNING LIGHTS SHALL BE LIGHT WEIGHT (3.3 LBS. OR LESS) OR HAVE BATTERY PACK MOUNTED NO HIGHER THAN 18-INCH AND SHALL NOT COVER ANY PORTION OF THE BARRICADE FACE.

IF WARNING LIGHTS ARE USED, THE LIGHTS SHOULD BE INSTALLED ON THE BARRICADES IN THE DIRECTION OF

IF SIGNS OR LIGHTS CANNOT MEET THE ABOVE REQUIREMENTS, THEY SHALL BE MOUNTED ON SEPARATE CRASHWORTHY DEVICES AT HEIGHTS SPECIFIED FOR POST MOUNTED SIGNS, LOCATED IN TABLE A ON SHEET 1. THE BARRICADE SHALL BE LOCATED IN FRONT OF THE SIGNS OR LIGHTS WITH 7 TO 10 FEET SEPARATING THE DEVICES.

TYPE 3 MOVABLE BARRICADES SHALL BE ENTIRELY FREE STANDING AND PORTABLE, MARKING SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR MAY BE APPLIED TO BOTH THE FRONT AND THE BACK OF EACH RAIL PROVIDED THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.

WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 104.2.7.4.

EXAMPLE 2 - FOR PAVED ROADWAYS WITH A WIDTH OF 20-FEET OR LESS AND WITHOUT PAVED SHOULDERS, TWO BARRICADES ARE ACCEPTABLE.

EXAMPLE 3 - WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

EXAMPLE 4 - WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, STRIPES SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES.

EXAMPLE 5 - WHERE NO TURNS ARE INTENDED, STRIPES POSITIONED TO SLOPE DOWNARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.



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## **TEMPORARY** TRAFFIC CONTROL DEVICES

TYPE 3 MOVABLE BARRICADE

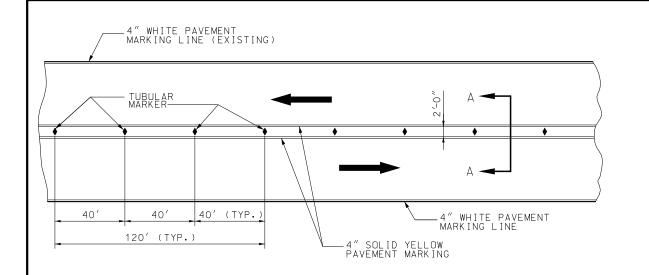
DATE EFFECTIVE: 10/01/2021 DATE PREPARED:

7/13/2021

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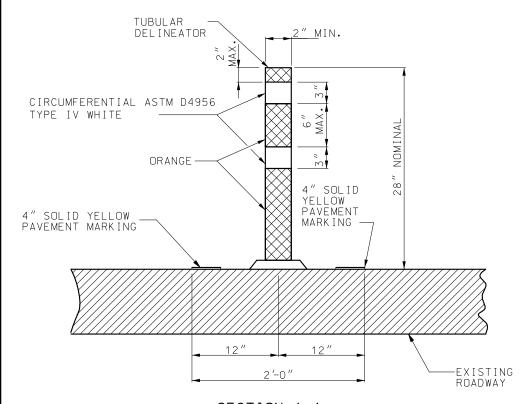
SHEET NO.

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## TWO LANE / TWO WAY TRAFFIC DELINEATION PLAN FOR DIVIDED HIGHWAY

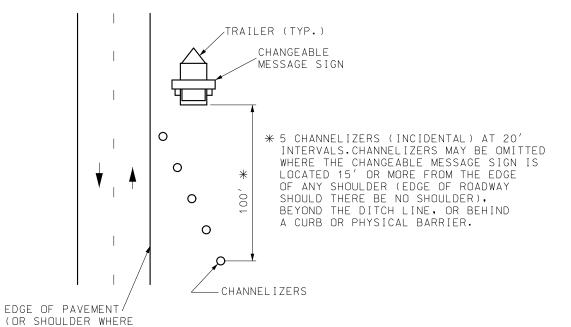
IF RAISED PAVEMENT MARKERS ARE PRESENT, THE LENSES SHALL BE REMOVED OR COVERED TO THE SATISFACTION OF THE ENGINEER.

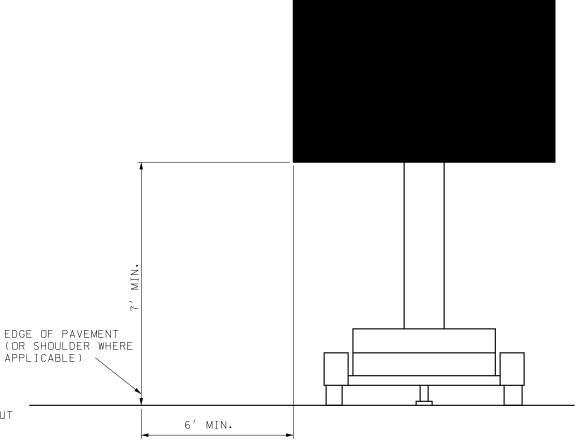


## SECTION A-A TUBULAR DELINEATOR DETAIL

AN ADHESIVE, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, SHALL BE USED TO APPLY THE TUBULAR DELINEATOR TO THE ROADWAY SURFACE. THE ADHESIVE SHALL PERMIT EASY REMOVAL OF THE TUBULAR DELINEATOR WITHOUT DAMAGE TO THE ROADWAY SURFACE.

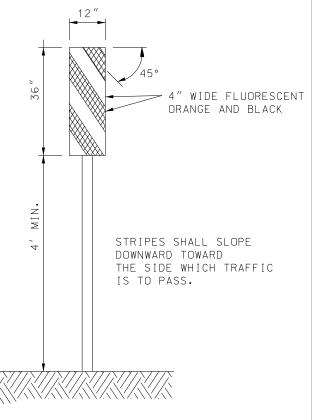
REFLECTIVE SHEETING APPLIED TO TUBULAR DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.





CHANGEABLE MESSAGE SIGN

APPLICABLE)

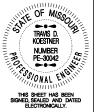


## TYPE 3 OBJECT MARKERS

FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.



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**TEMPORARY** TRAFFIC CONTROL DEVICES

DATE EFFECTIVE: 10/01/2021 DATE PREPARED:

7/13/2021

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SHEET NO. 5 OF 9

COMMISSION

WARNING SIGNS									
SIGN	SIZE	AREA	SHEETING	SYM. LEG. BRD.	BACK GROUND	DESIGNATION	DESCRIPTION		
WO1-1L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TURN (SYMBOL LEFT ARROW)		
WO1-1R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TURN (SYMBOL RIGHT ARROW)		
WO1-2L	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	CURVE (SYMBOL LEFT ARROW)		
WO1-2R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	CURVE (SYMBOL RIGHT ARROW)		
WO1-3L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE TURN (SYMBOL LEFT ARROW)		
WO1-3R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE TURN (SYMBOL RIGHT ARROW)		
WO1-4L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE CURVE (SYMBOL LEFT ARROW)		
WO1-4R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	REVERSE CURVE (SYMBOL RIGHT ARROW)		
W01-4bL	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (2)		
W01-4bR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (2)		
W01-4cL W01-4cR	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRIPLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (2) TRIPLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (2)		
W01-4CK	48X48 60X30	16.00 12.50	ASTM 9 OR 11 ASTM 9 OR 11	BK BK	FL. OR	SHF SHF	HORIZONTAL ARROW (SYMBOL)		
W01-6a	72X36	18.00	ASTM 9 OR 11	BK	FL. OR	SHF	HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE) (1)		
W01-7	60X30	12.50	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL)		
W01-7a	72X36	18.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE HEAD HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE)(1)		
WO1-8	18X24	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	CHEVRON (SYMBOL)		
W01-8a	30X36	7.50	ASTM 9 OR 11	BK	FL. OR	SHF	CHEVRON (SYMBOL FOR DIVIDED HIGHWAYS)		
WO3-1	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	STOP AHEAD (SYMBOL)		
WO3-2	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	YIELD AHEAD (SYMBOL)		
WO3-3	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	SIGNAL AHEAD (SYMBOL)		
W03-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BE PREPARED TO STOP		
WO3-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SPEED LIMIT AHEAD		
WO4-1L	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (SYMBOL FROM LEFT)		
WO4-1R	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (SYMBOL FROM RIGHT)		
W04-1a(L)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (ARROW SYMBOL) (3)		
W04-1a(R)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	MERGE (ARROW SYMBOL) (3)		
W05-1 W05-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF SHF	ROAD/BRIDGE/RAMP NARROWS (4)  ONE LANE BRIDGE		
W05-5	48X48 48X48	16.00	ASTM 9 OR 11 ASTM 9 OR 11	BK BK	FL. OR	SHF	NARROW LANES (3)		
W06-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIVIDED HIGHWAY (SYMBOL)		
W06-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DIVIDED HIGHWAY END (SYMBOL)		
W06-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TWO WAY TRAFFIC (SYMBOL)		
W07-3a	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	NEXT XX MILES (PLAQUE)		
WO8-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	BUMP		
WO8-2	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	DIP		
WO8-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	PAVEMENT ENDS		
WO8-4	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SOFT SHOULDER		
WO8-5	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SLIPPERY WHEN WET (SYMBOL)		
WO8-6	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRUCK CROSSING WITH FLAGS		
W08-6c	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	TRUCK ENTRANCE (3)		
W08-7a W08-9	36X36	9.00	ASTM 9 OR 11	BK	FL. OR	SHF	FRESH OIL/LOOSE GRAVEL (3)		
WO8-9	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF SHF	LOW SHOULDER UNEVEN LANES		
WO8-11	48X48 48X48	16.00	ASTM 9 OR 11 ASTM 9 OR 11	BK BK	FL. OR	SHF	NO CENTER LINE		
W08-15	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	GROOVED PAVEMENT		
W08-15p	30X24	5.00	ASTM 9 OR 11	BK	FL. OR	SHF	MOTORCYCLE (PLAQUE)		
WO8-17(L)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP-OFF (SYMBOL LEFT)		
WO8-17(R)	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	SHOULDER DROP OFF (SYMBOL RIGHT) (4)		
W08-17p	30X24	5.00	ASTM 9 OR 11	ВК	FL. OR	SHF	SHOULDER DROP-OFF (PLAQUE)		
W10-1	42 RND.	9.62	ASTM 9 OR 11	ВК	FL. YL	SHF	RAILROAD CROSSING		
WO12-1	24X24	4.00	ASTM 9 OR 11	BK	FL. OR	SHF	DOUBLE DOWN ARROW (SYMBOL)		
W012-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE (SYMBOL)		
W012-2×	24X18	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE (PLAQUE) (3)		
W012-2a	84X24	14.00	ASTM 9 OR 11	BK	FL. OR	SHF	OVERHEAD LOW CLEARANCE (FEET AND INCHES) (3)		
W012-4	120X60	50.00	ASTM 9 OR 11	BK	FL. OR	SHF	LOW CLEARANCE XX FT XX IN XX MILES AHEAD (3)		
W012-5 W013-1	120X60 30X30	50.00	ASTM 9 OR 11	BK BK	FL. OR	SHF SHF	WIDTH RESTRICTION XX FT XX IN XX MILES AHEAD (3) ADVISORY SPEED (PLAQUE)		
W013-1		6.25	ASTM 9 OR 11	BK	FL. OR	SHF	XXX FEET (PLAQUE)		
W016-3	30X24 30X24	5.00	ASTM 9 OR 11 ASTM 9 OR 11	BK BK	FL. OR	SHF SHF	X MILE (PLAQUE)		
W020-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD/BRIDGE/RAMP WORK AHEAD (4)		
W020-2	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR AHEAD		
W020-3	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	ROAD CLOSED AHEAD		
WO20-4	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	ONE LANE ROAD AHEAD		
W020-5	48X48	16.00	ASTM 9 OR 11	ВК	FL. OR	SHF	RIGHT/CENTER/LEFT LANE CLOSED AHEAD (4)		

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
- (2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
- (3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.
- (6) SHF REFER TO STD, 903,02 SHEET 1 OF 8

#### GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.

SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.

NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.

ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## **TEMPORARY** TRAFFIC CONTROL DEVICES WARNING SIGNS

DATE EFFECTIVE: 10/01/2021 DATE PREPARED: 7/13/2021

616.10AY

SHEET NO. 6 OF 9

WARNING SIGNS							
	SIZE	AREA			OLOR		
SIGN			SHEETING	SYM. LEG.	BACK	DESIGNATION	DESCRIPTION
W000 5	(IN.)	(SQ. FT.)		BRD.	GROUND	CHE	
W020-5a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	2 RIGHT/CENTER/LEFT LANES CLOSED AHEAD (4)
W020-6a	48X48	16.00	ASTM 9 OR 11	BK	FL, OR FL, OR	SHF SHF	RIGHT/CENTER/LEFT LANE CLOSED (3)(4)
W020-7	48X48	16.00	ASTM 9 OR 11	BK	FL. OR		FLAGGER (SYMBOL) WITH FLAGS
WO21-5 WO21-5a	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF SHF	SHOULDER WORK/SHOULDER WORK AHEAD (3)
W021-50	48X48 48X48	16.00	ASTM 9 OR 11 ASTM 9 OR 11	BK BK	FL. OR	SHF	RIGHT SHOULDER CLOSED
W021-3D W022-1	48X48	16.00	ASTM 9 OR 11	BK	FL. OR	SHF	RIGHT SHOULDER CLOSED AHEAD BLASTING ZONE AHEAD
W022-2	48X48 42X36	10.50	ASTM 9 OR 11	BK	FL, OR	SHF	TURN OFF 2-WAY RADIO AND PHONE
W022-3	42X36	10.50	ASTM 9 OR 11	BK	FL. OR	SHF	END BLASTING ZONE
G022-1	15X21	2,19	ASTM 9 OR 11	BK	FL. OR	SHF	WET PAINT (ARROW PIVOTS) (3)
						GUIDE SIGNS	
E05-1	36X48	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	GORE EXIT (3)
E05-2	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	EXIT OPEN (3)
E05-2a	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	EXIT CLOSED
G020-1	60X24	10.00	ASTM 9 OR 11	BK	FL, OR	SHF	ROAD WORK NEXT XX MILES
G020-2 G020-4	48X24	8.00	ASTM 9 OR 11	BK	FL. OR	SHF	PILOT CAR FOLLOW ME - REAR VEHICLE MOUNT SIGN
G020-4 G020-4a	36X18	4.50	ASTM 9 OR 11	BK	FL. OR	SHF	
G020-4a	42X30 18X12	8.75 1.50	ASTM 9 OR 11	BK BK	FL, OR FL, OR	SHF SHF	PILOT CAR IN USE WAIT & FOLLOW - STATE ROUTE SIGN PILOT CAR IN USE WAIT & FOLLOW - NON-STATE ROUTE SIGN
G020-4a G020-5aP	36X24	6.00	ASTM 9 OR 11 ASTM 9 OR 11	BK	FL. OR	SHF	WORK ZONE (PLAQUE) (3) (5)
MO4-8a	24X18	3.00	ASTM 9 OR 11	BK	FL. OR	SHF	END DETOUR
MO4-9L	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (LEFT ARROW)
MO4-9R	48X36	12.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (RIGHT ARROW)
MO4-9P	48X12	4.00	ASTM 9 OR 11	BK	FL. OR	SHF	STREET NAME (PLAQUE)
MO4-10L	48X18	6.00	ASTM 9 OR 11	ВК	FL. OR	SHF	DETOUR (ARROW LEFT)
MO4-10R	48X18	6.00	ASTM 9 OR 11	BK	FL. OR	SHF	DETOUR (ARROW RIGHT)
						REGULATORY SIG	
R1-1	48X48	13,25	ASTM 4	WH	RD	SH	STOP
R1-2	48 TRI.	6.93	ASTM 4	RD	WH	SH	YIELD
R1-2a	36X36	9.00	ASTM 4	BK	WH	SH	TO ONCOMING TRAFFIC (PLAQUE)
R1-3p	30X12	2.50	ASTM 4	WH	RD	SH	ALL WAY (PLAQUE)
R2-1	36X48	12.00	ASTM 4	BK	WH	SH	SPEED LIMIT XX
R3-1	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO RIGHT TURN (SYMBOL)
R3-2	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO LEFT TURN (SYMBOL)
R3-3	36X36	9.00	ASTM 4	BK	WH	SH	NO TURNS
R3-4 R3-7L	48X48	16.00	ASTM 4	BK/RD	WH	SH	NO U-TURN (SYMBOL)
	30X30	6.25	ASTM 4	BK	WH	SH	LEFT LANE MUST TURN LEFT
R3-7R R4-1	30X30 36X48	6.25 12.00	ASTM 4 ASTM 4	BK BK	WH WH	SH SH	RIGHT LANE MUST TURN RIGHT  DO NOT PASS
R4-1 R4-2	36X48	12.00	ASTM 4	BK	WH WH	SH	PASS WITH CARE
R4-7a	36X48	12.00	ASTM 4	BK	WH WH	SH	KEEP RIGHT (HORIZONTAL ARROW)
R4-8a	36X48	12.00	ASTM 4	BK	WH	SH	KEEP LEFT (HORIZONTAL ARROW)
R5-1	30X30	6.25	ASTM 4	RD	WH	SH	DO NOT ENTER
R5-1a	36X24	6.00	ASTM 4	WH	RD	SH	WRONG WAY
R6-1L	54X18	6.75	ASTM 4	ВК	WH	SH	ONE WAY ARROW (LEFT)
R6-1R	54X18	6.75	ASTM 4	BK	WH	SH	ONE WAY ARROW (RIGHT)
R6-2L	24X30	5.00	ASTM 4	ВК	WH	SH	ONE WAY (LEFT)
R6-2R	24X30	5.00	ASTM 4	ВК	WH	SH	ONE WAY (RIGHT)
R9-9	24X12	2.00	ASTM 4	BK	WH	SH	SIDEWALK CLOSED
R9-11L	24X18	3.00	ASTM 4	ВК	WH	SH	SIDEWALK CLOSED AHEAD, (ARROW RIGHT) CROSS HERE
R9-11R	24X18	3.00	ASTM 4	ВК	WH	SH	SIDEWALK CLOSED AHEAD, (ARROW LEFT) CROSS HERE
R10-6	24X36	6.00	ASTM 4	BK	WH	SH	STOP HERE ON RED (45° ARROW)
R11-2	48X30	10.00	ASTM 4	BK	WH	SH	ROAD CLOSED
R11-3a	60X30	12.50	ASTM 4	BK	WH	SH	ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY
R11-4	60X30	12.50	ASTM 4	BK	WH	SH	ROAD CLOSED TO THRU TRAFFIC
CONST-3A	60X48	20.00	ASTM 4	BK	WH/ FL. OR	SH	FINE SIGN (3)
CONST-3X	56X12	4.67	ASTM 4	BK	WH	SH	SPEEDING/PASSING (PLATE) (3)
CONST-5	48X36	12.00	ASTM 4	WH	BL MIS	SCELLANEOUS SI SH	IGNS POINT OF PRESENCE
CONST-5	96X48	32.00	ASTM 4	WH	BL	SH	POINT OF PRESENCE
CONST-7	72X36	18.00	ASTM 4	WH/BK	BL/FL.OR	SH	RATE OUR WORK ZONE
CONST-7	48X24	8.00	ASTM 4	WH/BK	BL/FL.OR	SH	RATE OUR WORK ZONE
CONST-8	48X36	12.00	ASTM 9 OR 11	BK	FL.OR	SHF	WORK ZONE NO PHONE ZONE
001131 0	10/30	12.00	7.5 TW 5 OIX TT	וט	. 2.010	2111	WORK ZONE INO FRIONE ZONE

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
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- (3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.
- (6) SH REFER TO STD, 903,02 SHEET 1 OF 8
- (7) SHF REFER TO STD. 903.02 SHEET 1 OF 8

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.

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#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

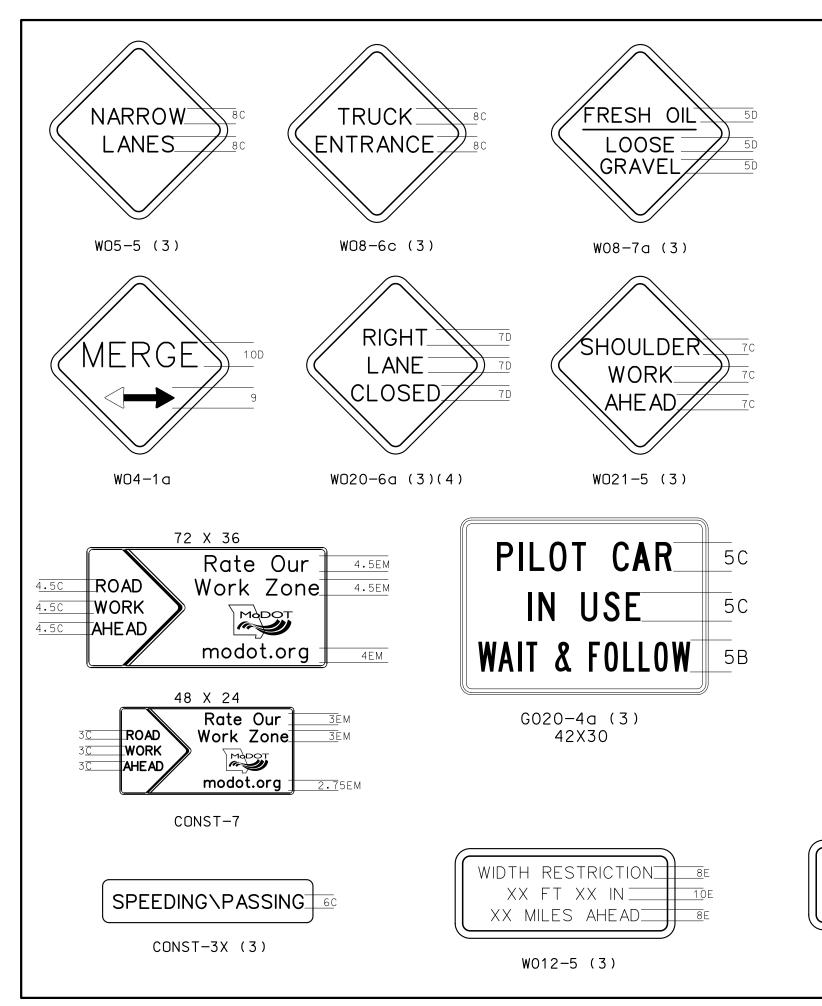


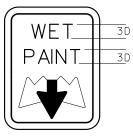
## TEMPORARY TRAFFIC CONTROL DEVICES WARNING, GUIDE AND REGULATORY SIGNS

DATE EFFECTIVE: 01/01/2022 DATE PREPARED: 10/21/2021

616.10AY

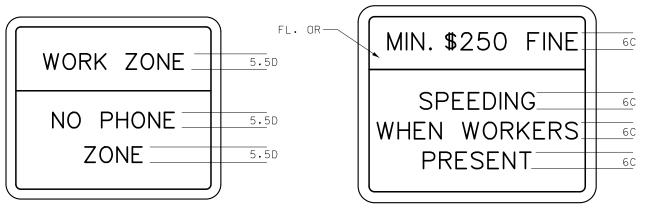
SHEET NO. 7 OF 9





G022-1(3)

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
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- (3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION FHWA.
- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.



CONST-8 (3) CONST-3A (3)



G020-4a (3)(4) 18X12



G020-4 (3) 36X18



W012-4(3)

GENERAL NOTES:

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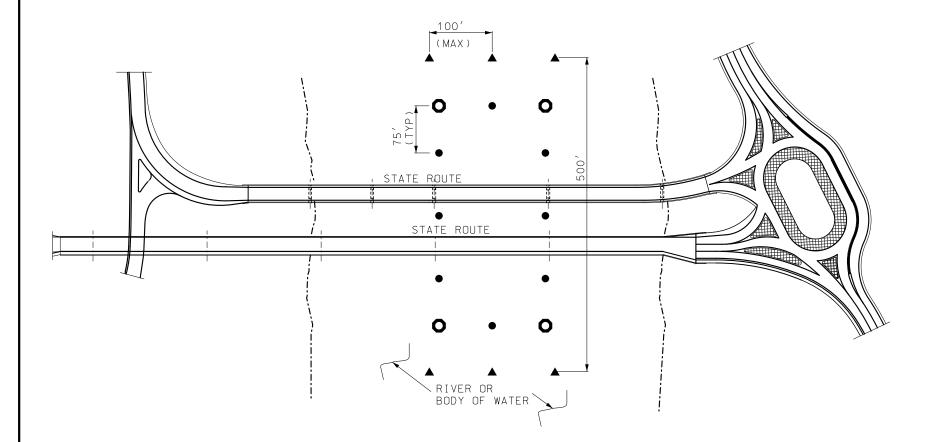
ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.

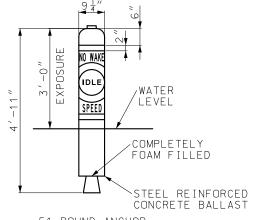
LETTER DIMENSIONS SHALL BE AS SHOWN.



### LEGEND

- O- BOATS KEEP OUT (SIGN)
- - BOATS KEEP OUT (BUOY)
- ▲ NO WAKE (BUOY)

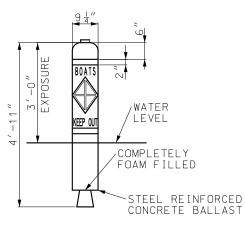




51 POUND ANCHOR TACKLE PERMITTED

## RESTRICTED AREA BUOY

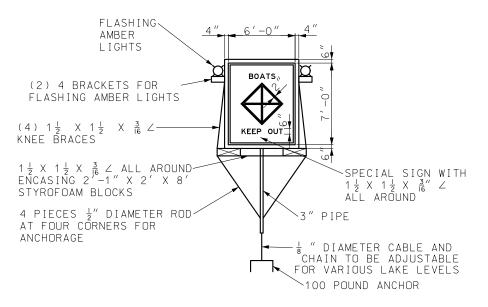
("NO WAKE") (6 REQUIRED - ROADWAY ITEM)



51 POUND ANCHOR TACKLE PERMITTED

## CONTROLLED AREA BUOY

("BOATS KEEP OUT") (8 REQUIRED - ROADWAY ITEM)



## SPECIAL SIGN ASSEMBLY

("BOATS KEEP OUT") (4 REQUIRED - ROADWAY ITEM)

#### GENERAL NOTES:

INFORMATION SHOWN IS SCHEMATIC ONLY. FINAL LOCATION AND NUMBER OF SIGNS AND BUOYS IS SUBJECT TO APPROVAL OF MISSOURI STATE WATER PATROL

THE DETAILS SHOWN ARE FOR BIDDING PURPOSES ONLY. ALL MATERIALS AND LABOR NECESSARY TO INSTALL AND REMOVE

SIGNS SHALL BE INCIDENTAL TO OTHER ITEMS

THE CONTRACTOR IS RESPONSIBLE FOR BUOY MAINTENANCE THROUGHOUT CONSTRUCTION AND FOR DETERMINING ANTICIPATED WATER LEVELS DURING CONSTRUCTION. EACH SIGN AND BUOY SHALL BE ANCHORED TO BOTTOM OF LAKE.

SIGNS SHALL BE DOUBLE FACED

EACH SIGN SHALL BE EQUIPPED WITH TWO (2) FLASHING LIGHT UNITS WITH AMBER LENS. FLASHING LIGHT UNITS SHALL BE FURNISHED AND MAINTAINED BY THE CONTRACTOR

ALL LETTERING TO BE BLACK IN COLOR IN BLOCK FORM.

FOR OTHER INFORMATION AND LOCATION OF SIGNS AND BUOYS SEE SPECIAL PROVISIONS.

SCHEMATIC SHOWN IS FOR ONE NAVIGATIONAL SPAN. FOR WORK ON OTHER SPANS MOVE APPROPRIATE SIGNS WITH NO DIRECT PAY

COLOR:

BACKGROUND - WHITE LEGEND - BLACK

2" REFLECTIVE BAND AND SYMBOL - INTERNATIONAL ORANGE



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



**TEMPORARY** TRAFFIC CONTROL DEVICES TRAFFIC CONTROL FOR WATERWAYS

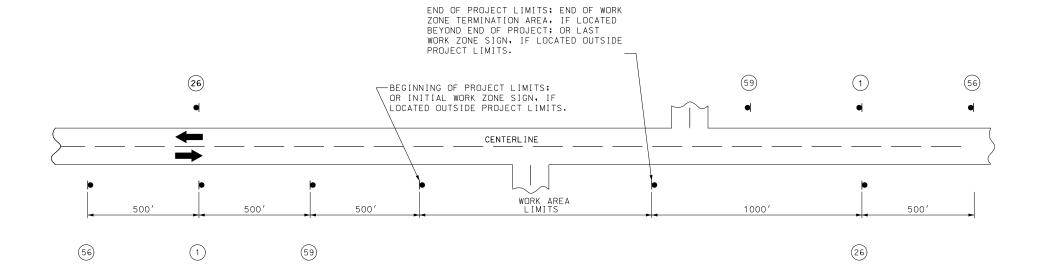
DATE PREPARED:

616.10AY

SHEET NO.

DATE EFFECTIVE: 10/01/2021 7/13/2021

9 OF 9



NOTES:

SIGN (1) AND (26) ARE ONLY USED ON PROJECT LENGTHS 2 MILES OR GREATER.

PROVIDE SIGNS IN EACH DIRECTION ON TWO-WAY HIGHWAY.

DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS.









THIS TEMPORARY TRAFFIC CONTROL IS FOR USE ON THE FOLLOWING PAVEMENT TREATMENT PROJECTS AND IS NOT INTENDED FOR USE WHEN ADDITIONAL CONSTRUCTION ITEMS SUCH AS SHOULDER WIDENING, PIPE REPLACEMENT OR EXTENSIONS, GUARDRAIL CONSTRUCTION OR REPAIR, AND/OR SIGN INSTALLATIONS ARE PART OF THE PROJECT:

- ASPHALTIC RESURFACING (SECTIONS 401 AND 402)
- SEAL COAT
- SCRUB SEAL/SAND SEAL

NOT TO SCALE



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# TEMPORARY TRAFFIC CONTROL PLANS

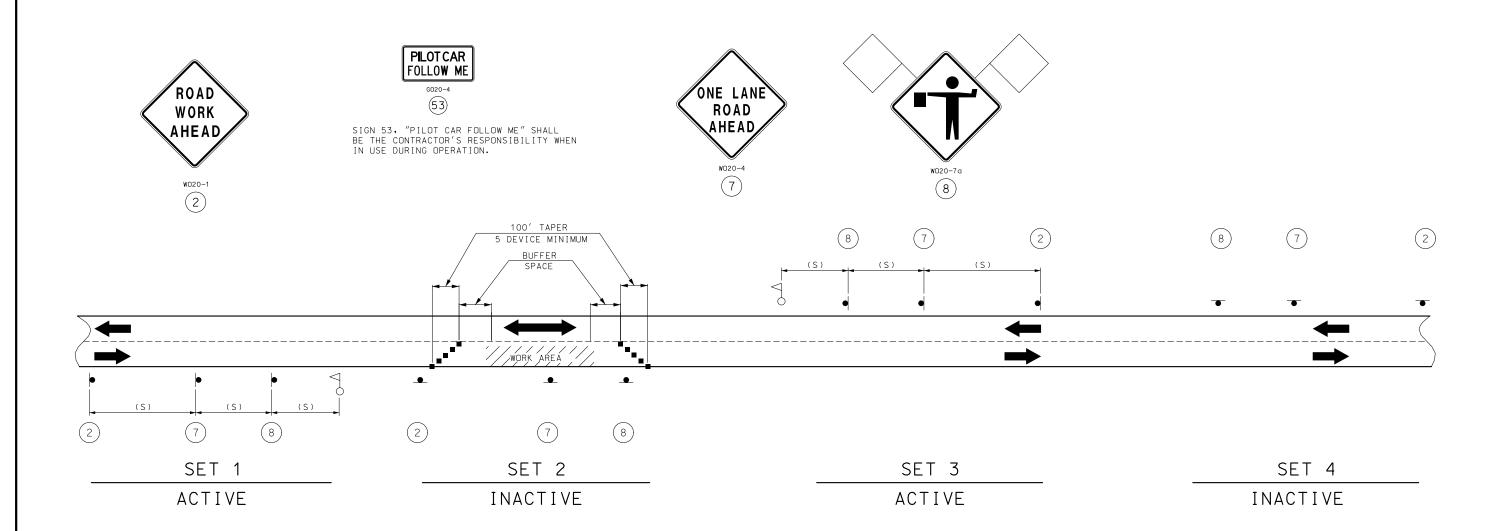
PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE:
DATE PREPARED:

07/01/2021 4/29/2021

616.20

SHEET NO.



NOTES:

DAYLIGHT FLAGGING OPERATIONS ONLY.

CHANNELIZING DEVICES LOCATED DOWNSTREAM OF THE ONE-LANE, TWO-WAY TAPER ARE OPTIONAL. THESE DEVICES SHOULD BE ELIMINATED WHEN THEIR USE WILL REDUCE THE USABLE LANE WIDTH, INCLUDING ANY ACCEPTABLE SHOULDERS, TO LESS THAN 10' OR WILL SIGNIFICANTLY AFFECT THE RESURFACING OPERATION.

SIGN SETS 1 AND 3 ARE ACTIVE AND (I.E., SIGNS FACE ONCOMING TRAFFIC) SIGN SETS 2 AND 4 ARE INACTIVE (I.E., SIGNS DO NOT FACE EITHER DIRECTION OF TRAFFIC) WHEN THE RESURFACING OPERATION IS LOCATED BETWEEN SIGN SETS 1 AND 3.

WHEN SIGN SETS 2 AND 4 ARE ACTIVE, SIGN SETS 1 AND 3 BECOME INACTIVE AND ARE ADVANCED TO BECOME SETS 2 AND 4 WITH SIGN LEGENDS TURNED AWAY FROM BOTH DIRECTIONS OF TRAFFIC. WHEN THE RESURFACING OPERATION ADVANCES TO BETWEEN SIGN SETS 2 AND 4, SIGN SETS 2 AND 4 BECOME ACTIVE (I.E., NEW SIGN SETS 1 AND 3) AND SIGN SETS 1 AND 3 ADVANCED IN THE DIRECTION OF THE OPERATION (I.E., NEW SIGN SETS 2 AND 4).

WHEN TEMPORARY RUMBLE STRIPS ARE USED, REFER TO EPG FIGURE 616.6.87.1 FOR DISTANCES AND SPACING.

- CHANNELIZERS

- FLAGGER

SPEED	SIGN SPACING (FT.) (1)			
PERMANENT POSTED (MPH)	NON-DIVIDED HIGHWAYS (S)			
0-35	200			
40-45	350			
50-55	500			
60-70	1000			

#### NOTES:

(1) SPACING BETWEEN SIGNS, BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER OR SIGNED CONDITION.

SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.

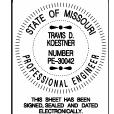
PERMANENT POSTED	BUFFER SPACE		
SPEED LIMIT	LENGTH		
(MPH)	(FT)		
0 - 35	280		
40 - 45	400		
50 - 55	560		
60 - 70	840		

NOT TO SCALE



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# TEMPORARY TRAFFIC CONTROL PLANS

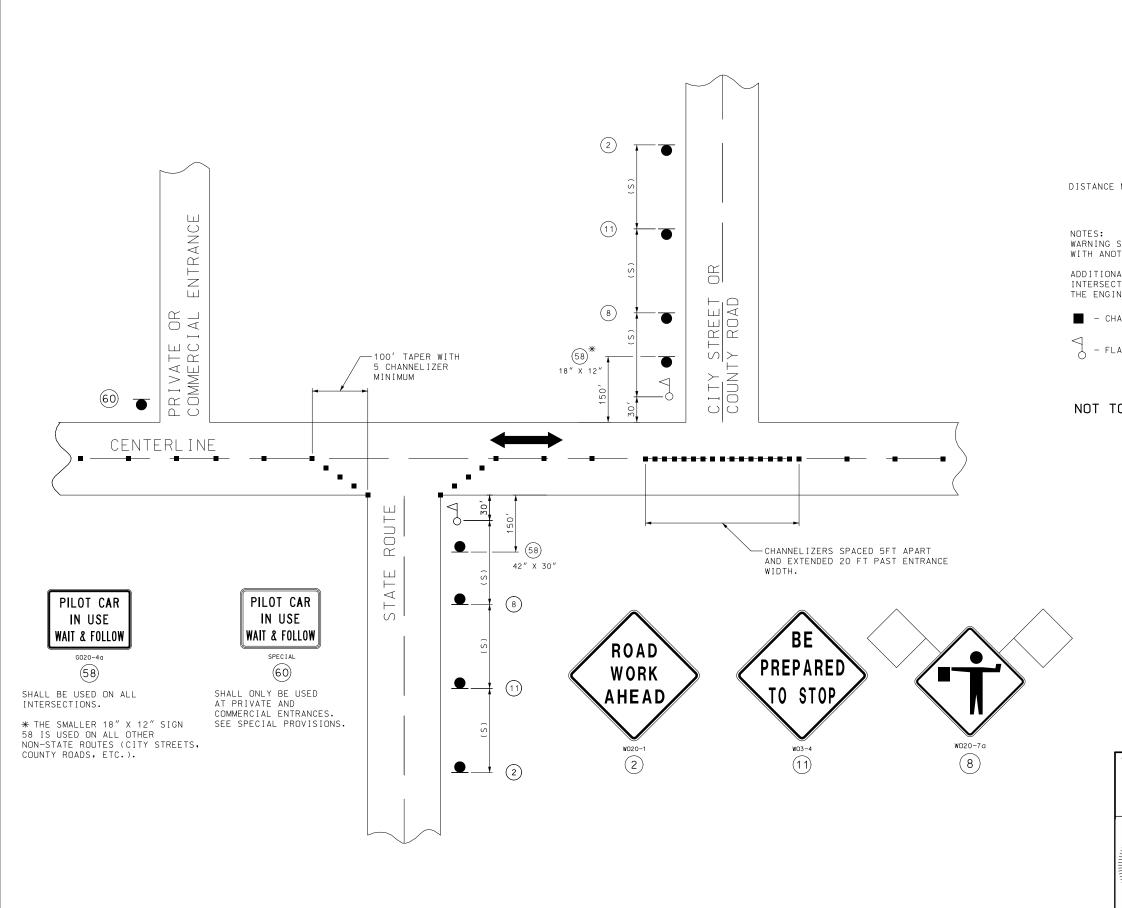
PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE:
DATE PREPARED:

07/01/2021 5/12/2021

616.20

SHEET NO.



SIDE ROADS ENTERING WORK ZONES

SPEED	SIGN SPACING (FT.)
PERMANENT POSTED (MPH)	NON-DIVIDED HIGHWAYS (S)
0-35	200
40-45	350
50-55	500
60-70	1000

DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS.

WARNING SIGNS SHALL BE ERECTED AT EACH INTERSECTION WITH ANOTHER STATE HIGHWAY WITHIN THE WORK ZONE.

ADDITIONAL WARNING SIGNS SHALL BE ERECTED AT OTHER INTERSECTIONS WITHIN THE WORK ZONE, AS DIRECTED BY

- CHANNELIZERS ( AS SPECIFIED)

NOT TO SCALE



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## TEMPORARY TRAFFIC CONTROL PLANS

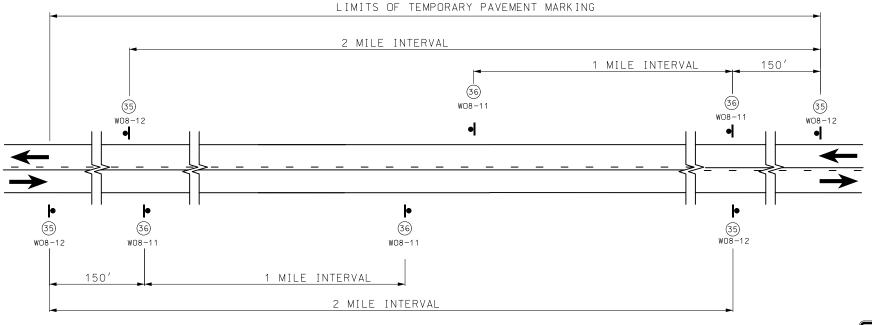
PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE: DATE PREPARED:

07/01/2021 4/29/2021

616.20

SHEET NO. 3 OF 5



SIGN SPACING AND TEMPORARY STRIPING FOR MAINLINE

PILOT CAR IN USE WAIT & FOLLOW

G020-4a







SIGN (35) AND TEMPORARY RAISED PAVEMENT MARKING
(SEE STANDARD PLAN 620.10) INSTALLED WHERE CENTERLINE
STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO
REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE
PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE
COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING
HAS BEEN INSTALLED.

SIGN 35 IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

SEE STANDARD PLAN 620.10 FOR ALL TEMPORARY PAVEMENT MARKING.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# TEMPORARY TRAFFIC CONTROL PLANS

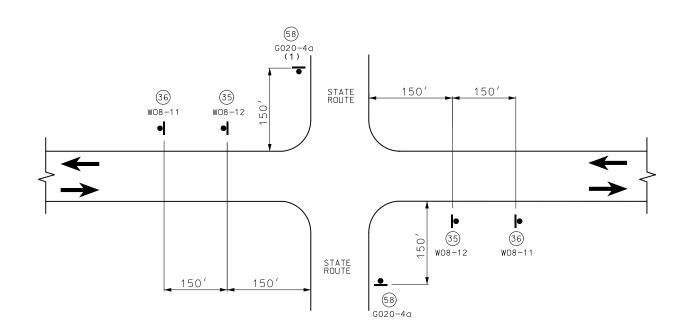
PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

DATE EFFECTIVE:
DATE PREPARED:

07/01/2021 4/29/2021

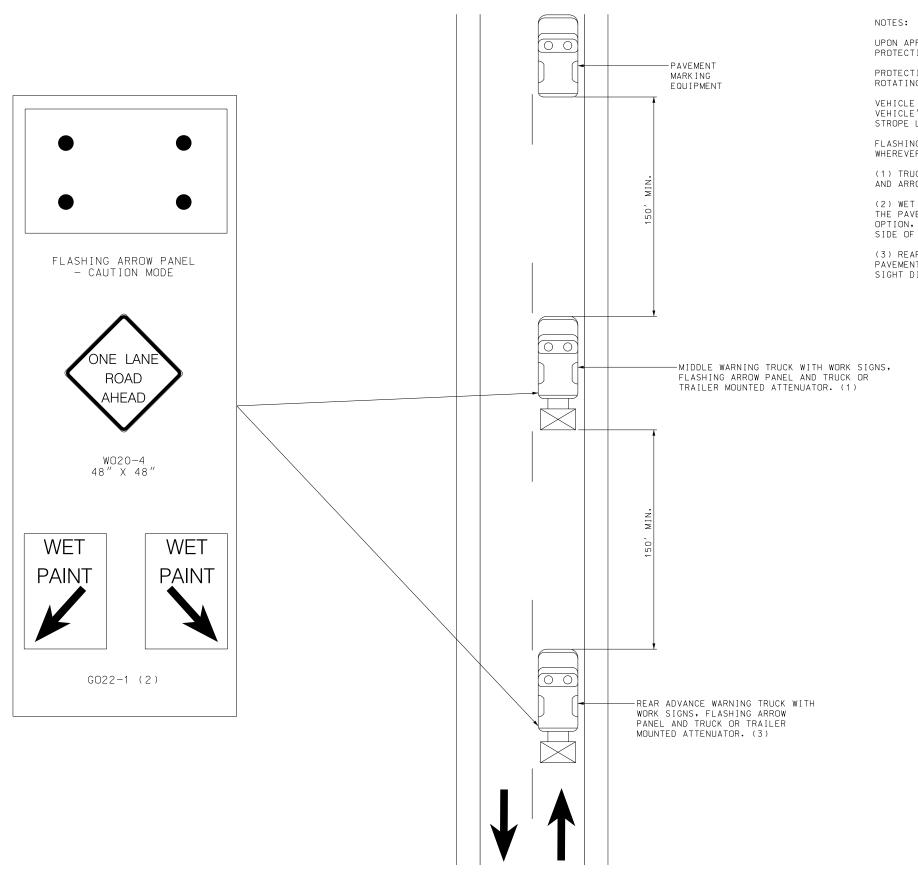
616.20

SHEET NO.



SIGN SPACING AT STATE ROUTE INTERSECTIONS SHOWING TEMPORARY STRIPING FOR MAINLINE

## NOT TO SCALE



UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY PROVIDE ADDITIONAL PROTECTIVE TRUCK EQUIPPED WITH PROPER WARNING DEVICES.

PROTECTIVE TRUCK AND WORK VEHICLES SHALL DISPLAY HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROBE LIGHTS.

VEHICLE HAZARD WARNING SIGNALS SHALL NOT BE USED INSTEAD OF THE VEHICLE'S HIGH-INTENSITY ROTATING, FLASHING, OSCILLATING, OR STROPE LIGHTS.

FLASHING ARROW PANELS SHALL BE INCIDENTAL TO TRUCK MOUNTED ATTENUATORS, WHEREVER USED. NO ADDITIONAL PAYMENT SHALL BE MADE.

- (1) TRUCK IS OPTIONAL ON TWO-LANE UNDIVIDED HIGHWAYS IF SIGNING AND ARROW BOARD IS MOUNTED ON THE PAVEMENT MARKING EQUIPMENT.
- (2) WET PAINT SIGNS ARE INSTALLED TO INDICATE THE SIDE IN WHICH THE PAVEMENT MARKING MATERIAL IS BEING APPLIED. AT THE CONTRACTOR'S OPTION, A FRONT FACING WET PAINT SIGN MAY BE INSTALLED ON THE LEFT SIDE OF THE PAVEMENT MARKING EQUIPMENT.
- (3) REAR ADVANCE WARNING TRUCK IS POSITIONED AT THE NO TRACK POINT OF THE PAVEMENT MARKING MATERIAL, OR VERTICAL OR HORIZONTAL CURVES THAT RESTRICT SIGHT DISTANCE, OR SPACING SHOWN.

MoDOT

# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# TEMPORARY TRAFFIC CONTROL PLANS

PAVEMENT TREATMENTS FOR TWO-LANE ROADWAYS

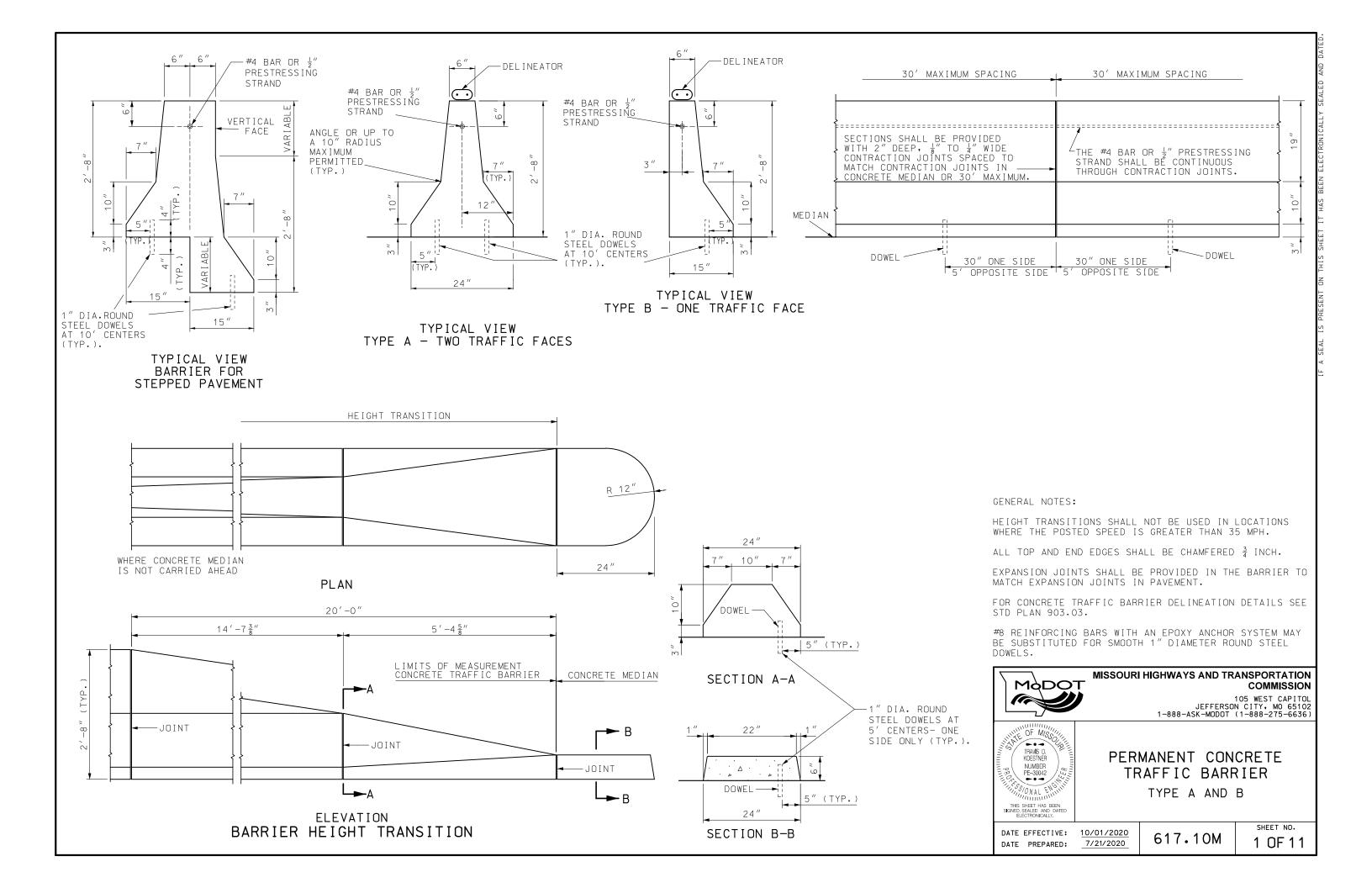
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DATE PREPARED:

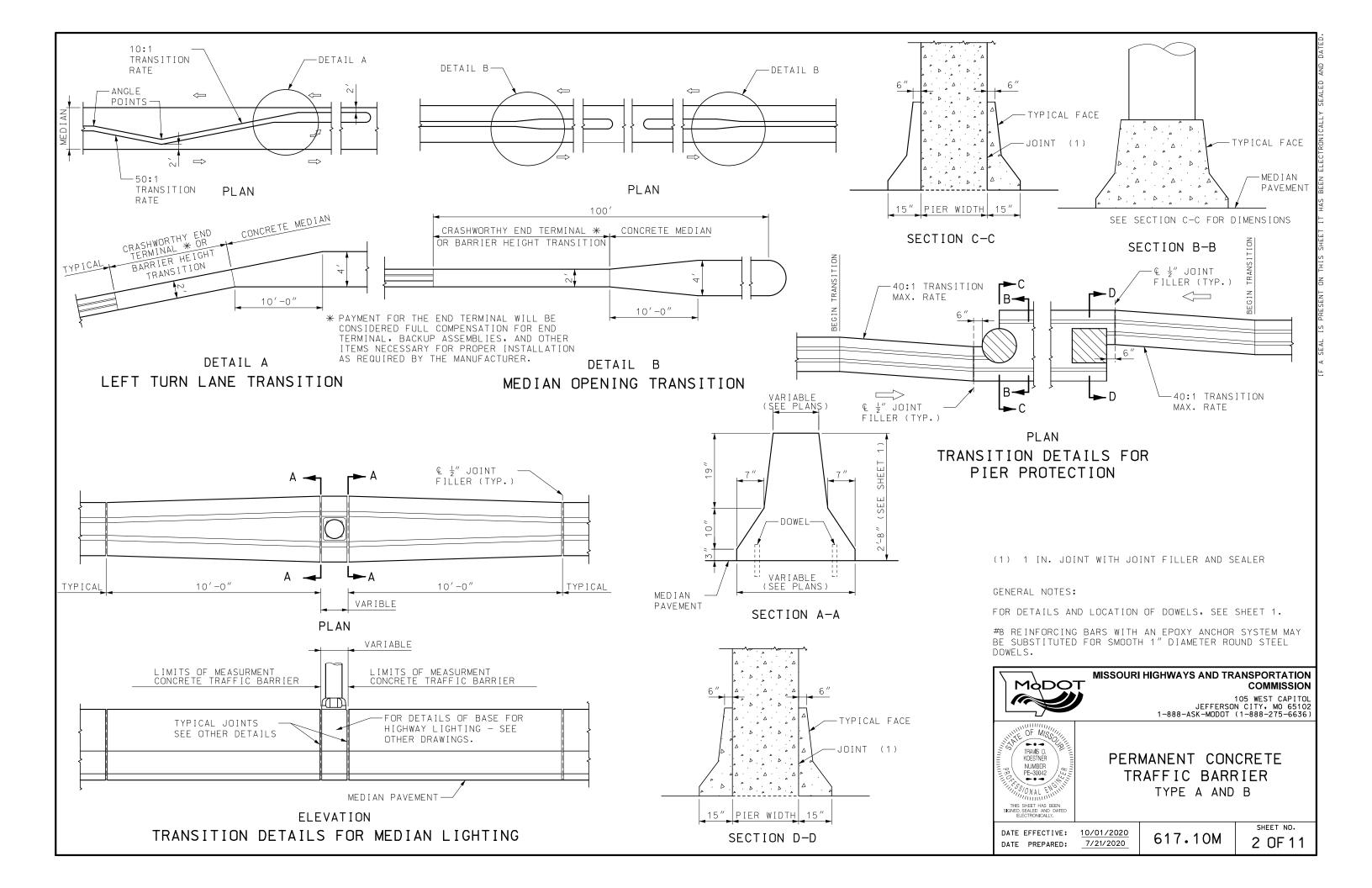
07/01/2021 4/29/2021

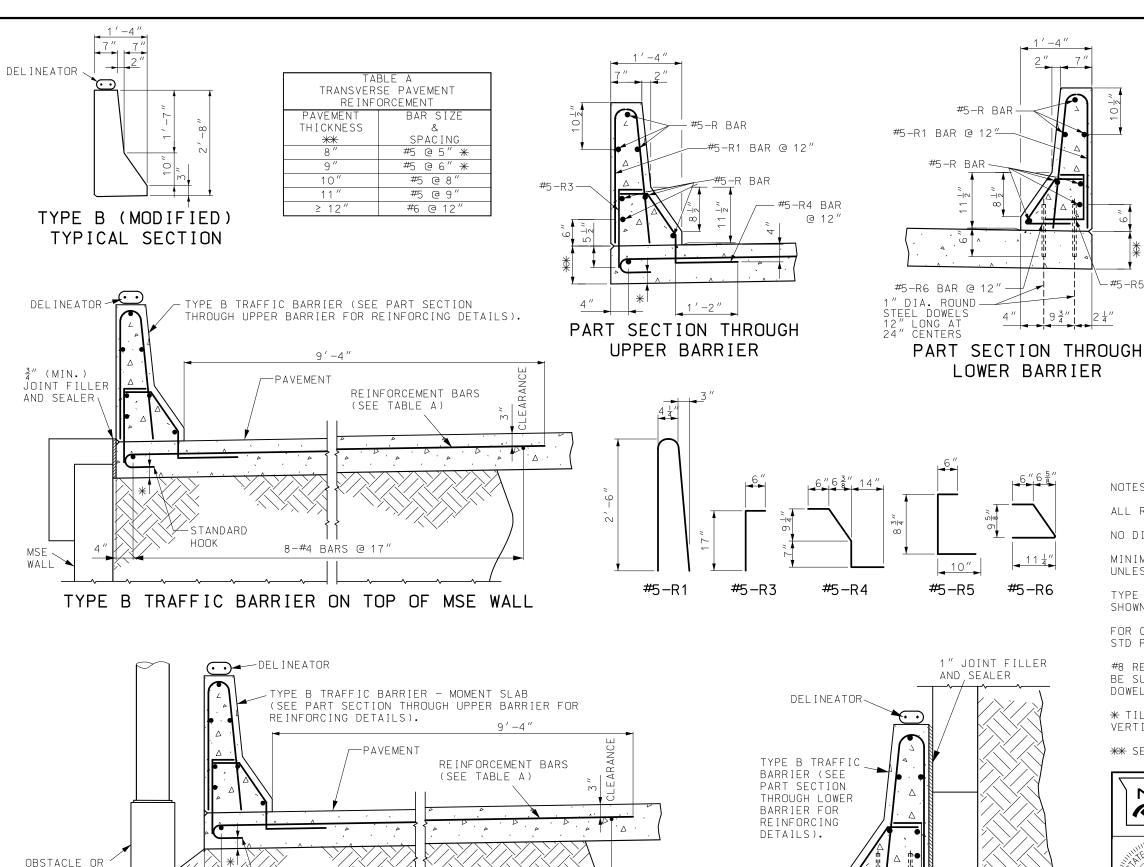
616.20

5 OF 5

CENTERLINE/EDGELINE STRIPING ON TWO-LANE HIGHWAYS







EMBANKEMT (SLOPE VARIES

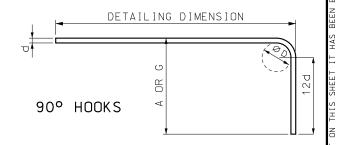
STANDARD

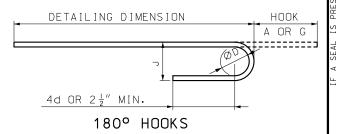
TYPE B TRAFFIC BARRIER - MOMENT SLAB\*\*

8-#4 BARS @ 17"

END HOOK DIMENSIONS								
		ALL GRADES						
BAR SIZE	D	180°	HOOKS	90° HOOKS				
0122	(IN.)	A OR G	J	A OR G				
#5	3 <del>3</del> "	7 "	5 "	10"				
#6	4 ½"	8 "	6"	12"				

ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.





NOTES:

TYPE B TRAFFIC BARRIER AT THE

SIDE OF MSE WALL

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ , UNLESS OTHERWISE SHOWN.

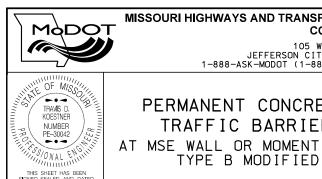
TYPE B (MODIFIED) SHALL BE USED ONLY AT LOCATIONS SHOWN IN PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

\* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 ½" MINIMUM CLEARANCE.

\*\* SEE ROADWAY PAVEMENT DESIGN.



DATE PREPARED:

## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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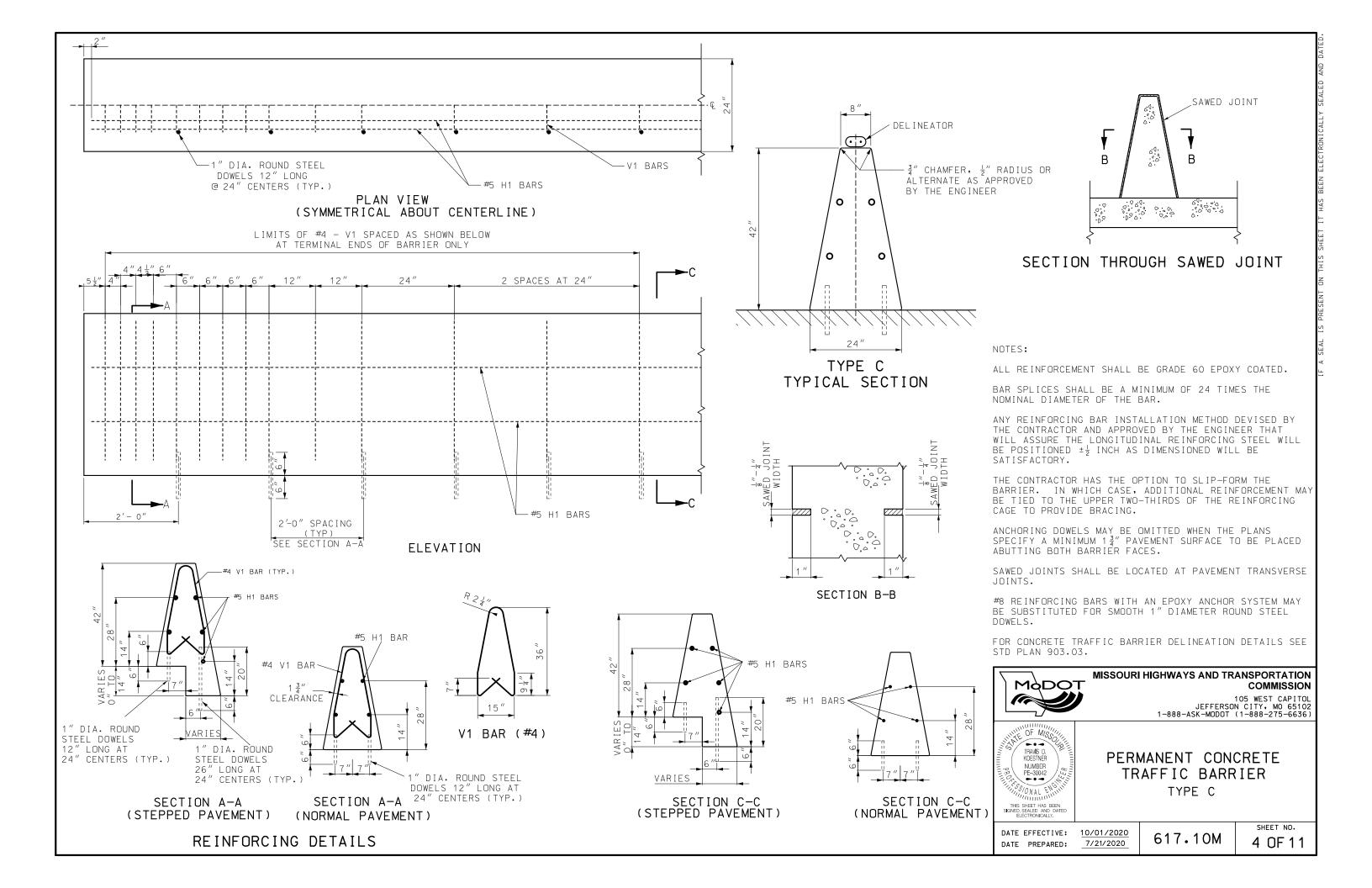
PERMANENT CONCRETE TRAFFIC BARRIER MSE WALL OR MOMENT SLAB

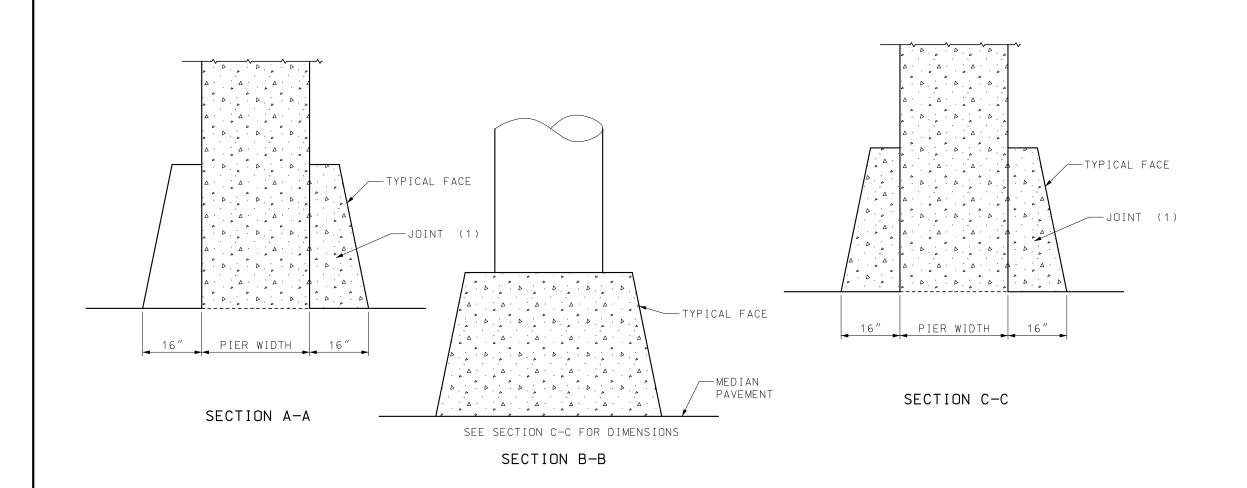
DATE EFFECTIVE: 10/01/2020

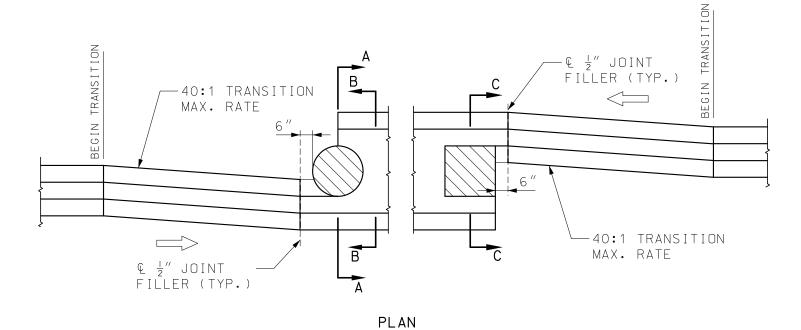
7/21/2020

617.10M

SHEET NO. 3 OF 11







TRANSITION DETAILS FOR PIER PROTECTION

(1) 1 IN. JOINT WITH JOINT FILLER AND SEALER



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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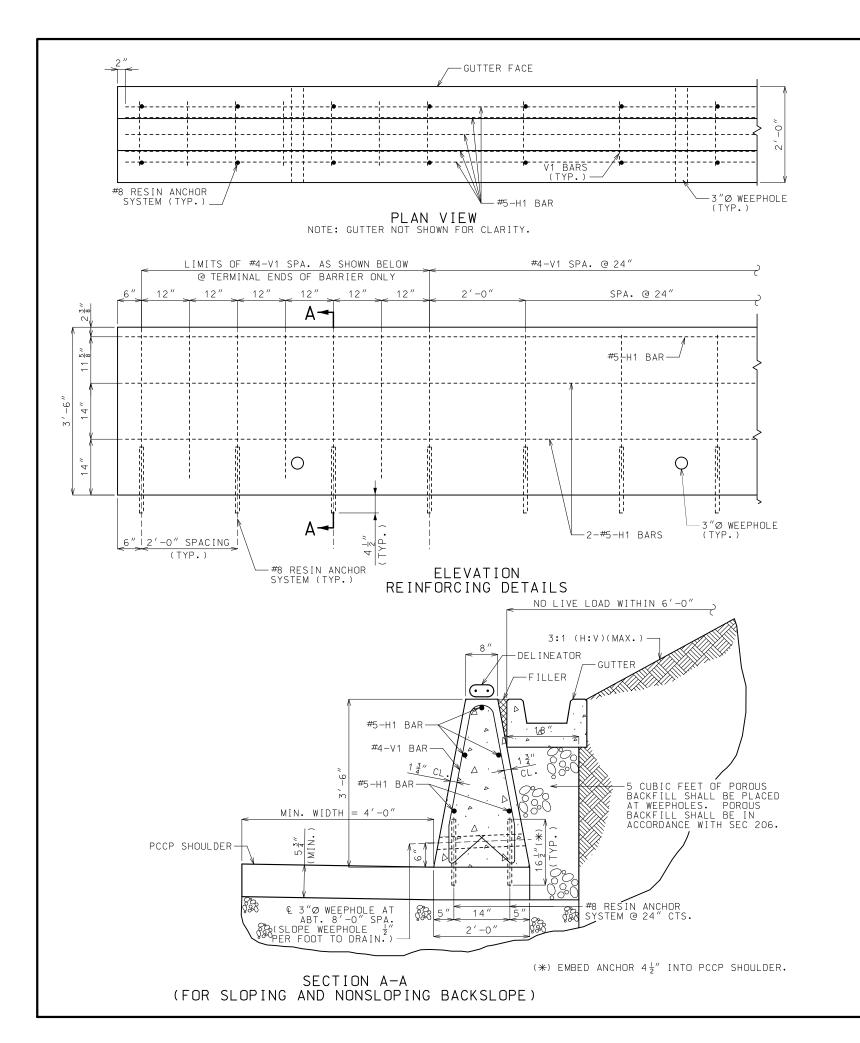


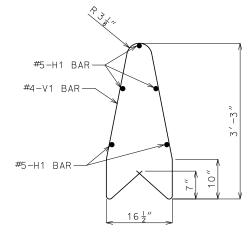
PERMANENT CONCRETE TRAFFIC BARRIER TYPE C

DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020

617.10M

SHEET NO. 5 OF 11





PART SECTION OF #4-V1 BAR

CONCRETE SHALL BE CLASS B F'C = 4,000 PSI.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION, ФF ≥ 27° FOR BACKFILL MATERIAL.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1  $\frac{1}{2}^{\prime\prime}$  , UNLESS OTHERWISE SHOWN.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.

ANY METHOD DEVISED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED ±1/2 INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.

SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.

TYPE C BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.

WHEN BARRIER HEIGHT EXCEEDS 42  $^{\prime\prime}$  OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6  $^{\prime}$  -0  $^{\prime\prime}$  , CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# PERMANENT CONCRETE TRAFFIC BARRIER

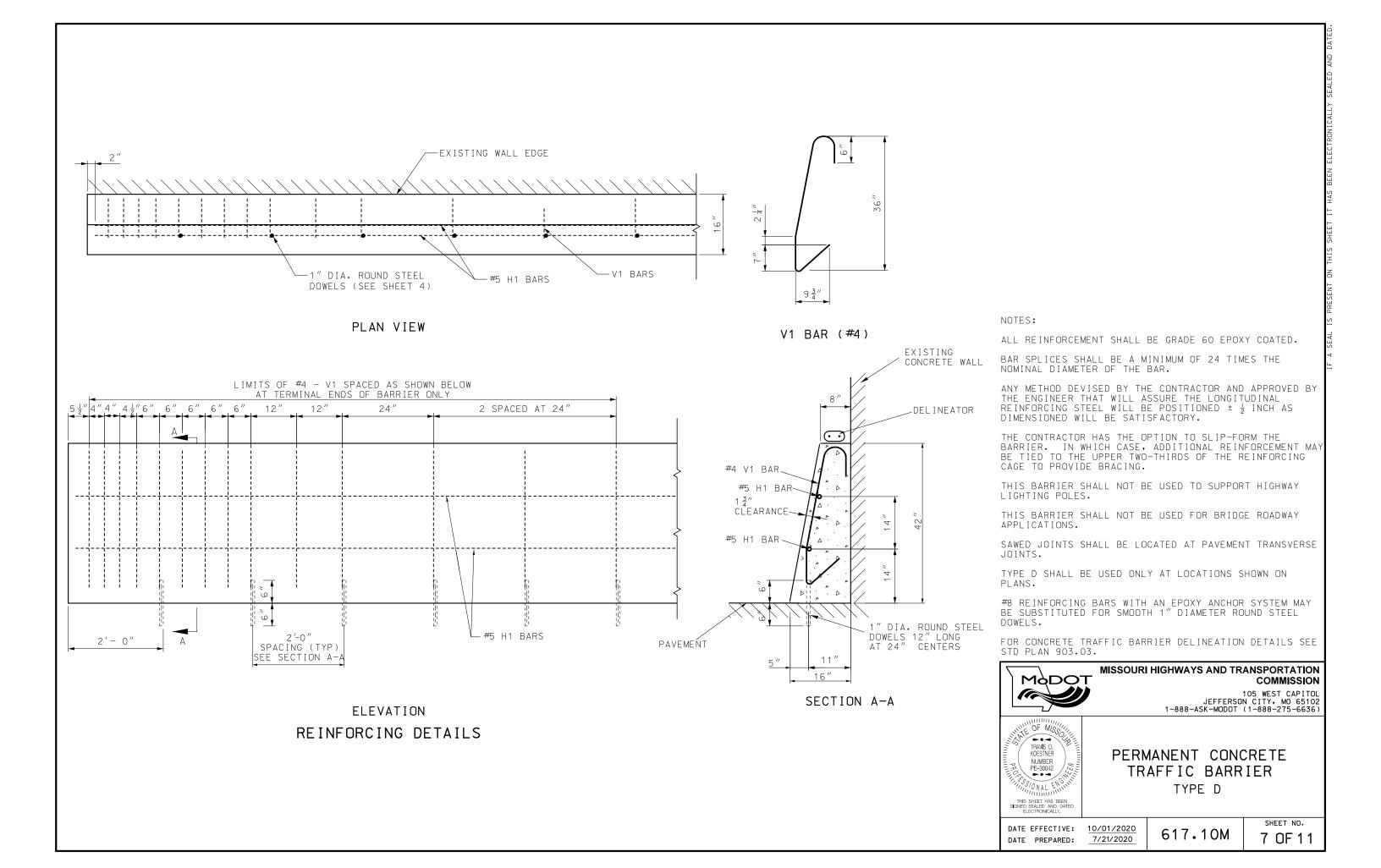
TYPE C AS RETAINING WALL

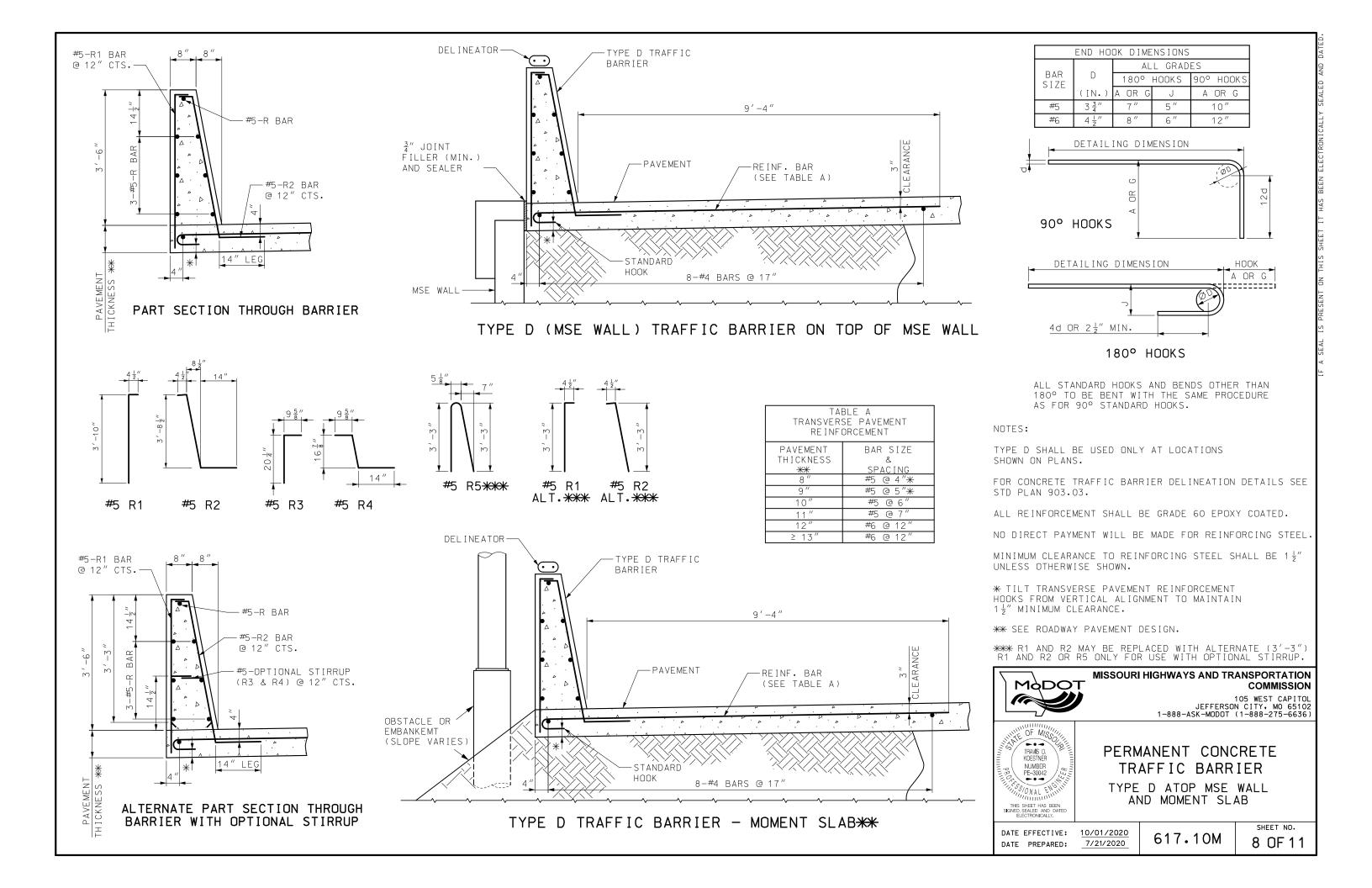
DATE EFFECTIVE:
DATE PREPARED:

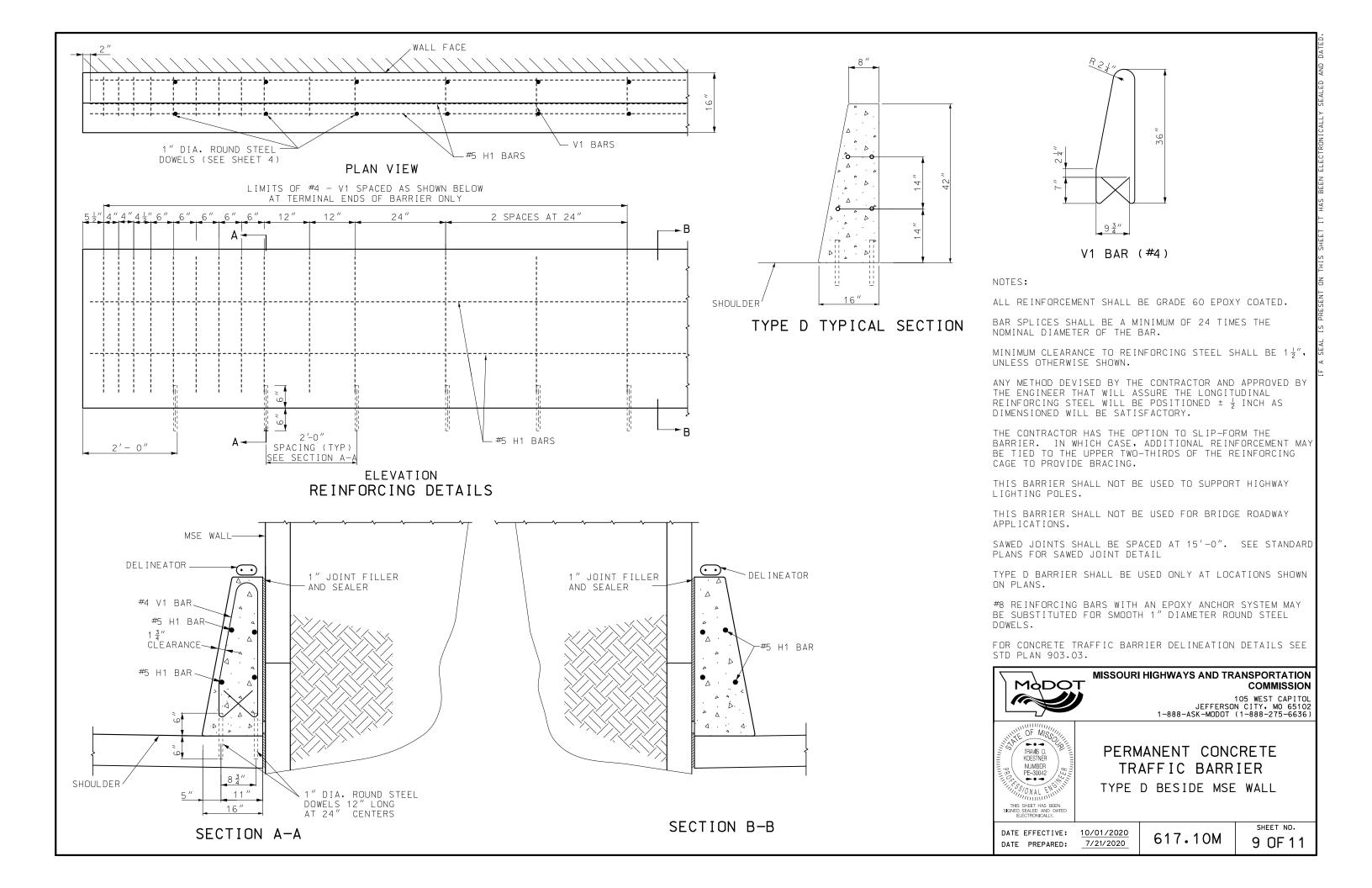
10/01/2020 7/21/2020

617.10M

10M 6 OF 11







CONCRETE SHALL BE CLASS B f'c = 4,000 PSI.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION,  $\phi f \ge 30^{\circ}$  FOR BACKFILL MATERIAL.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1-1/2", UNLESS OTHERWISE SHOWN.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.

ANY METHOD DEVISED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REFORCING STEEL WILL BE POSITIONED ±1/2 INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATION.

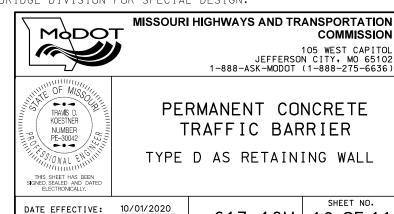
SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.

TYPE D BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.

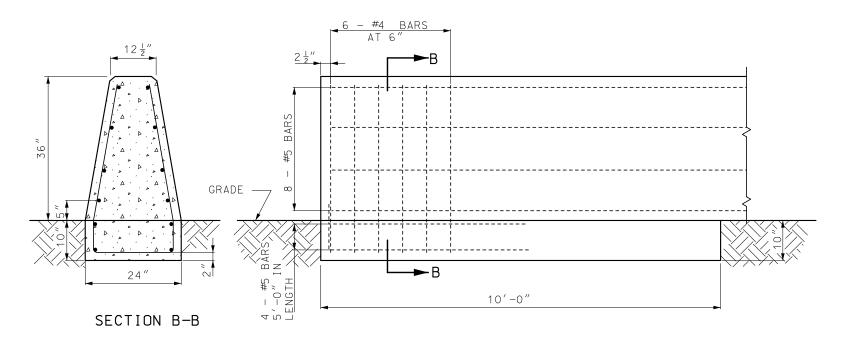
WHEN BARRIER HEIGHT EXCEEDS 42" OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6'-0", CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

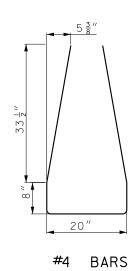


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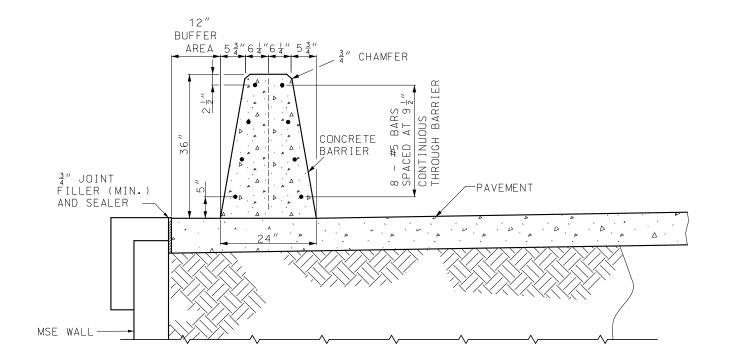
617.10M

10 OF 11





CONCRETE BARRIER END ANCHORAGE ON GRADE



TRAFFIC BARRIER ON TOP OF MSE WALL

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\,\frac{1}{2}$ , UNLESS OTHERWISE SHOWN.

A 12" BUFFER REQUIRED WITHIN THE LIMITS OF THE TRAFFIC BARRIER EXCLUDING THE END ANCHORAGE SECTIONS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

PAVEMENT SURFACE DIFFERENTIAL SHALL NOT EXCEED  $1\frac{1}{2}"$ .

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# PERMANENT CONCRETE TRAFFIC BARRIER

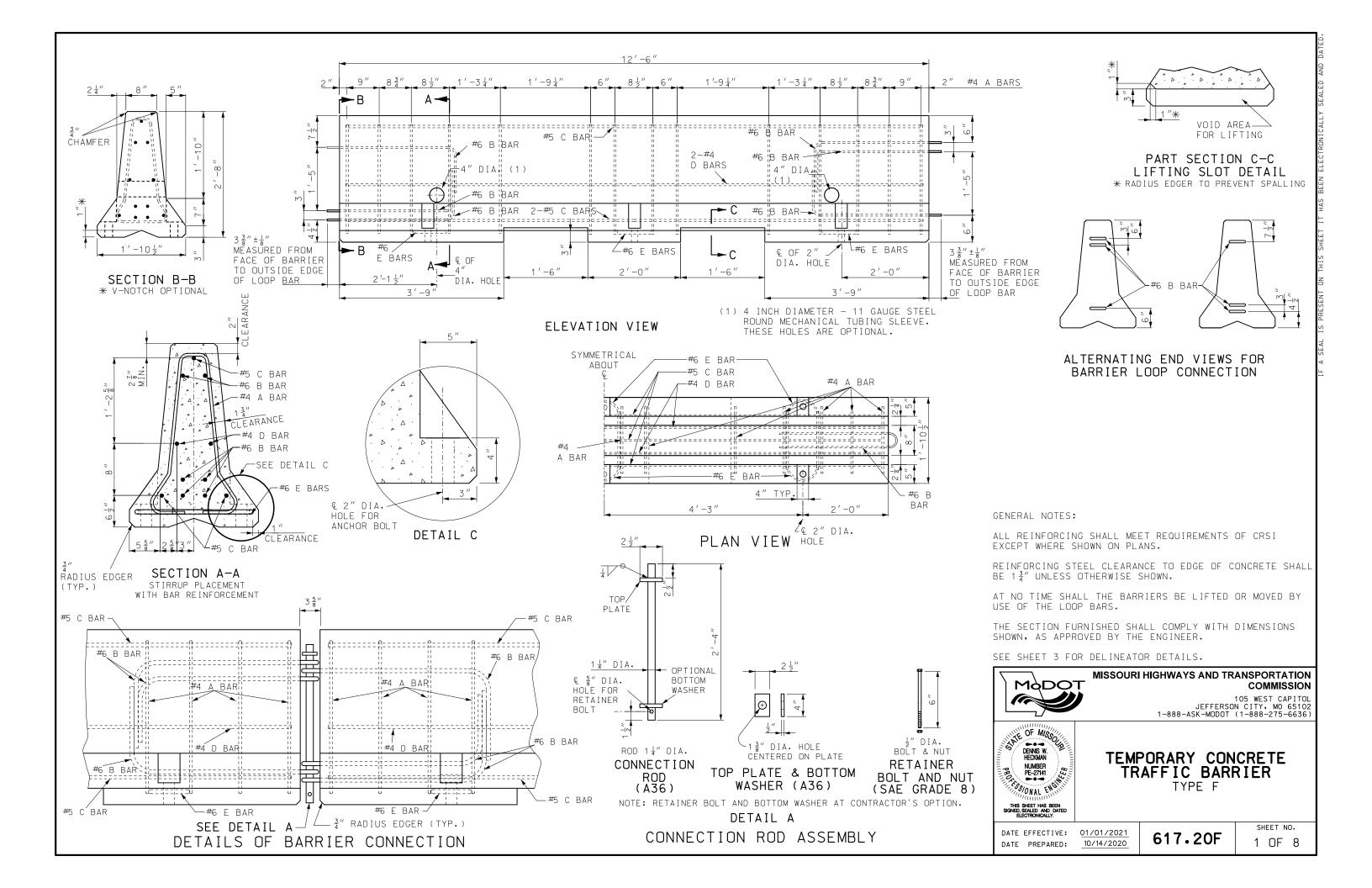
TYPE E ATOP MSE WALL

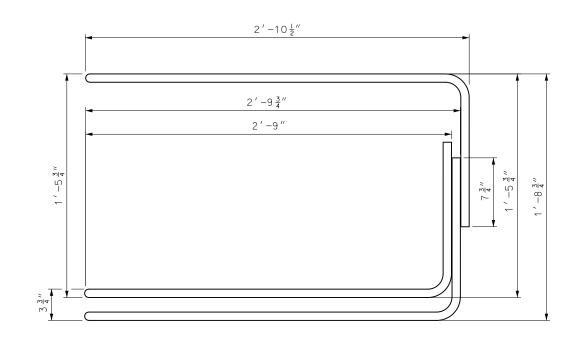
DATE EFFECTIVE:
DATE PREPARED:

7/21/2020

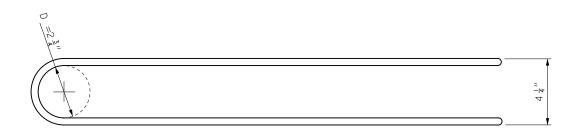
617.10M

SHEET NO. 110F11

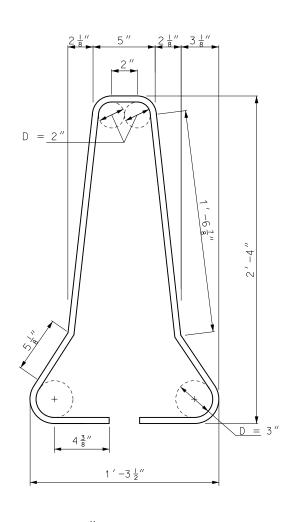




#6 B BAR ELEVATION



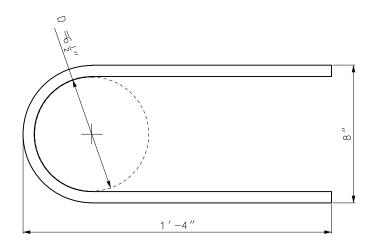
#6 B BAR PLAN



#4 A BARS

	REINFORCING BARS PER 12'- 6" BARRIER SECTION									
MARK	BAR SIZE	NO. OF BARS	SHAPE OF EACH	LENGTH EACH (NOM.)	WEIGHT					
А	4	14	V	6'-5"	60.8	lbs				
С	5	3		12'-2"	38.1	Sql				
D	4	2		12'-2"	16.3	ВdІ				
Ε	6	6		2'-11"	26.3	lbs				
	LOOP ASSEMBLY									
В	6	6		7′-10″	70.5	lbs				

CONCRETE VOLUME 1.3 CU YDS APPROXIMATE WEIGHT 5601 LBS.



#6 E BAR

DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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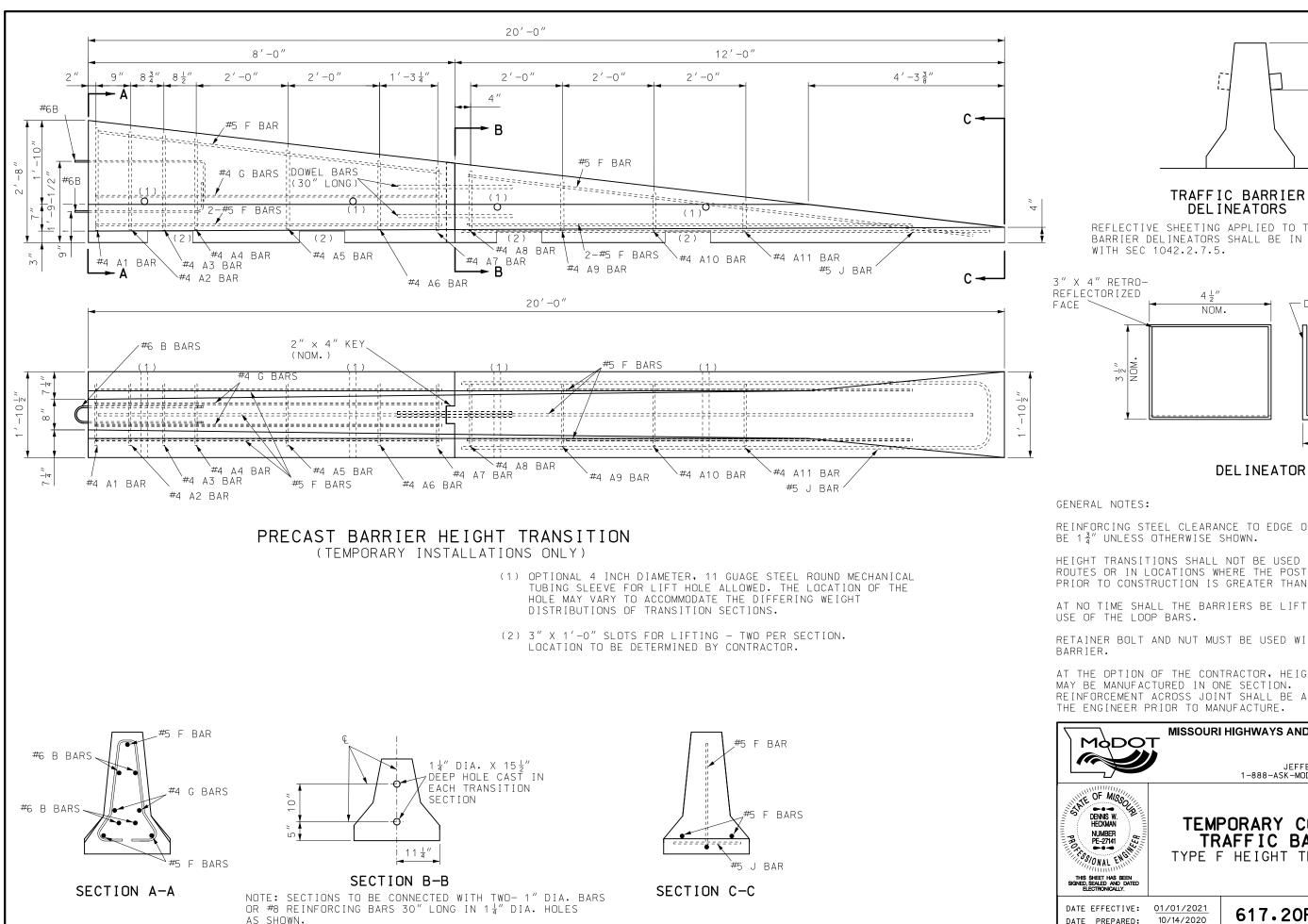
## TEMPORARY CONCRETE TRAFFIC BARRIER

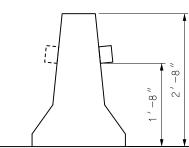
TYPE F

DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

617.20F

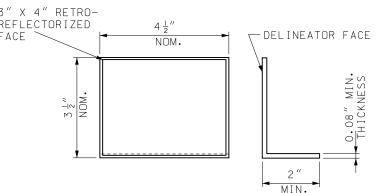
SHEET NO. 2 OF 8





## TRAFFIC BARRIER **DELINEATORS**

REFLECTIVE SHEETING APPLIED TO TRAFFIC BARRIER DELINEATORS SHALL BE IN ACCORDANCE



REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL BE 13" UNLESS OTHERWISE SHOWN.

HEIGHT TRANSITIONS SHALL NOT BE USED ON INTERSTATE ROUTES OR IN LOCATIONS WHERE THE POSTED SPEED PRIOR TO CONSTRUCTION IS GREATER THAN 35 MPH.

AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY

RETAINER BOLT AND NUT MUST BE USED WITH TRANSITION

AT THE OPTION OF THE CONTRACTOR, HEIGHT TRANSITIONS MAY BE MANUFACTURED IN ONE SECTION. THE PLANS FOR REINFORCEMENT ACROSS JOINT SHALL BE APPROVED BY THE ENGINEER PRIOR TO MANUFACTURE.

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

## TEMPORARY CONCRETE TRAFFIC BARRIER

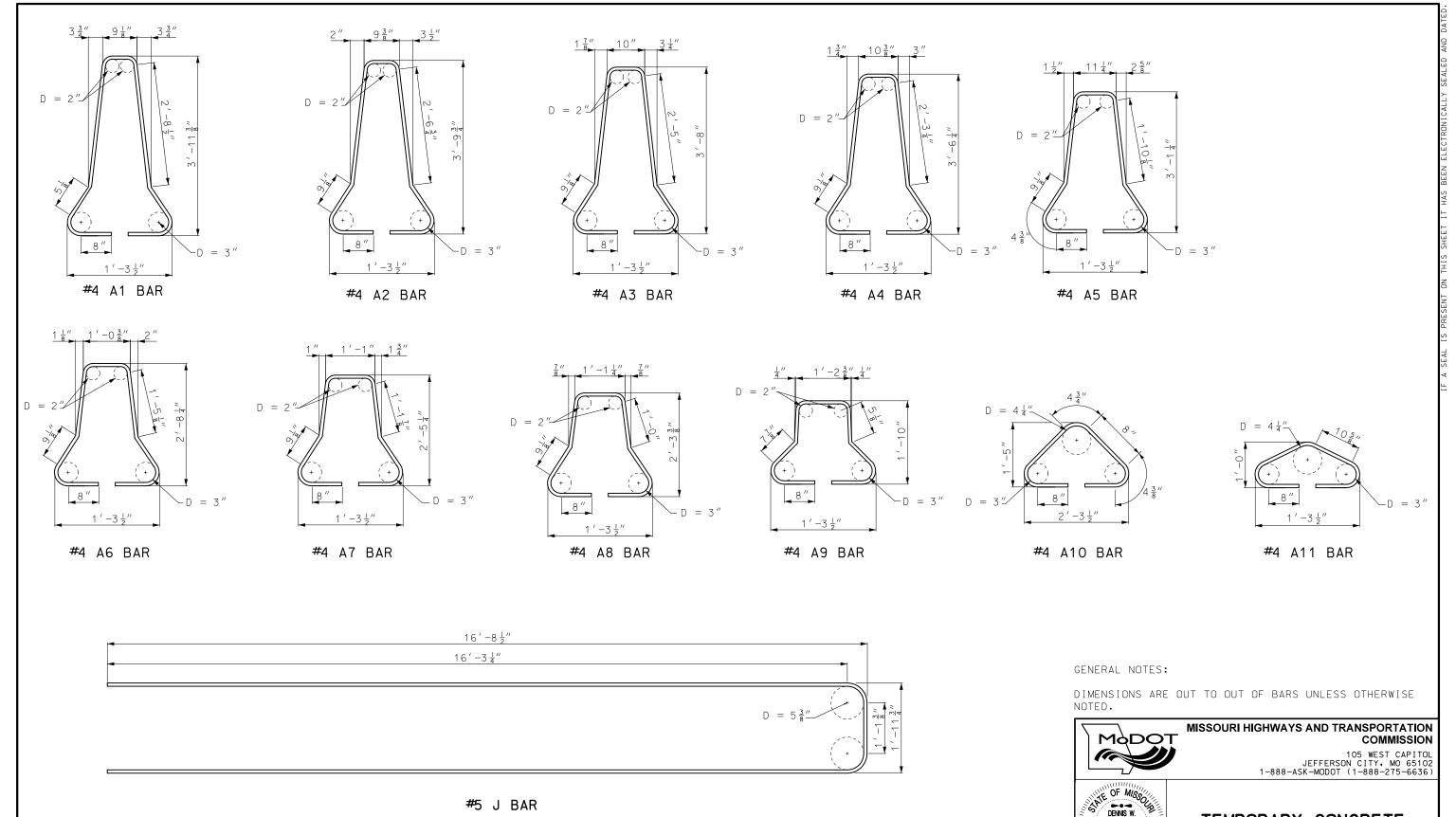
TYPE F HEIGHT TRANSITIONS

DATE PREPARED:

10/14/2020

617.20F

SHEET NO. 3 OF 8



NOTE: FOR DETAILS OF B BARS, SEE SHEET 2 OF 6.

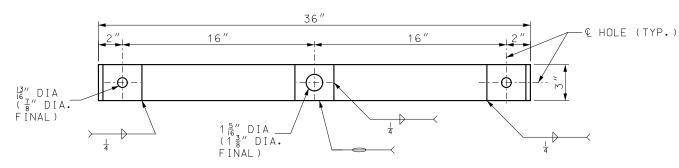


## TEMPORARY CONCRETE TRAFFIC BARRIER TYPE F HEIGHT TRANSITIONS

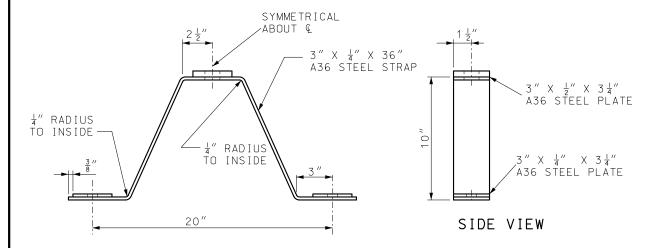
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

617.20F

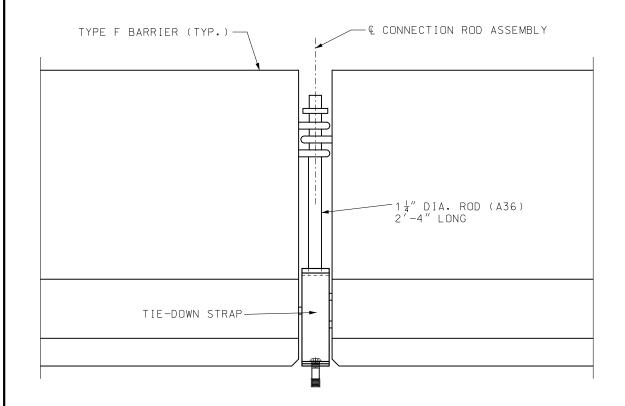
SHEET NO. 4 OF 8



PLAN OF TIE-DOWN STRAP



DETAILS OF TYPE F TEMPORARY BARRIER TIE-DOWN STRAP



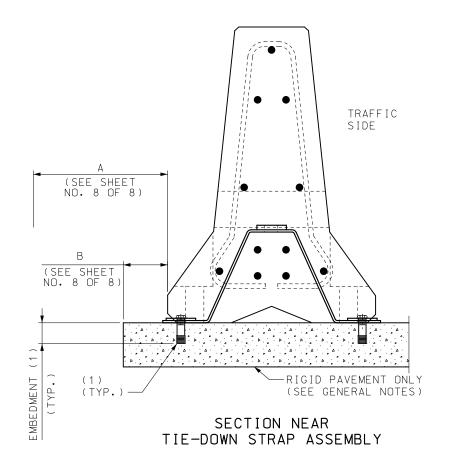
PART ELEVATION OF BARRIER

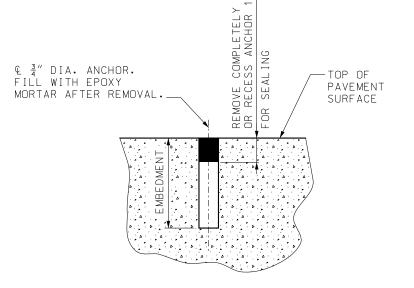
(1) TIE-DOWN STRAP ANCHOR SHALL BE ONE OF THE FOLLOWING:

 $\frac{3}{4}''$  DROP IN ANCHOR WITH A  $3\frac{1}{4}''$  EMBEDMENT AND  $\frac{3}{4}''$  DIA. X  $1\frac{3}{4}''$  LONG GRADE 5 BOLT.

RED HEAD LARGE DIAMETER TAPCON (LDT)  $\frac{3}{4}''$  X  $4\frac{1}{2}''$  LONG WITH A 4'' EMBEDMENT.

SIMPSON TITEN HD  $\frac{3}{4}$ " DIA. X 5" LONG WITH A 4½" EMBEDMENT.





DETAIL SHOWING SEALING OF HOLES AFTER REMOVAL OF TIE-DOWN BOLTS

GENERAL NOTES:

TIE-DOWN STRAP SYSTEMS ARE ONLY APPLICABLE ON RIGID PAVEMENTS.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.



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## TEMPORARY CONCRETE TRAFFIC BARRIER

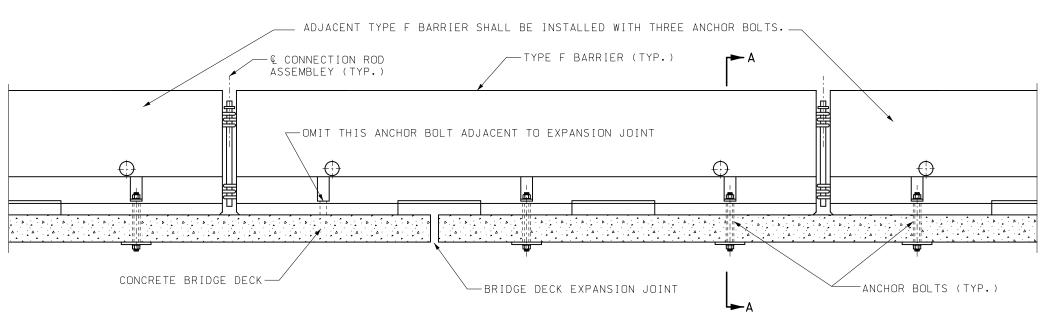
ANCHORED (TIE-DOWN STRAP SYSTEM)

DATE PREPARED: 10/14/2020

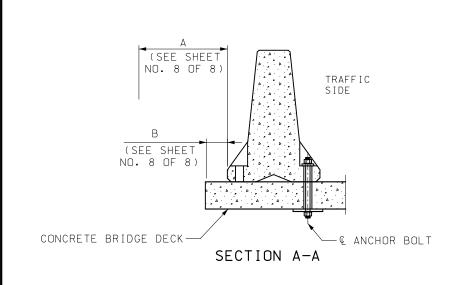
DATE EFFECTIVE: 01/01/2021

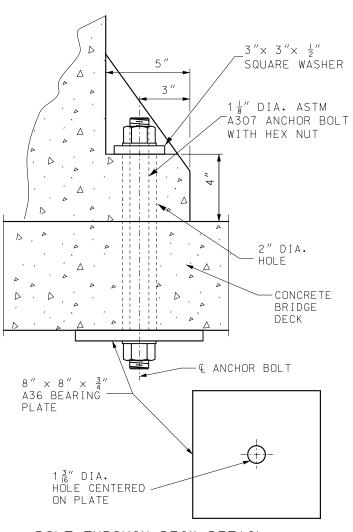
617.20F

SHEET NO. 5 OF 8



BOLT THROUGH DECK AT THERMAL EXPANSION JOINTS





BOLT THROUGH DECK DETAIL

ANCHOR BOLT SYSTEMS ARE ONLY APPLICABLE ON BRIDGE DECKS AND RIGID PAVEMENTS.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR BOLTS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704 OR AN EPOXY BONDING AGENT IN ACCORDANCE WITH SEC 1039.



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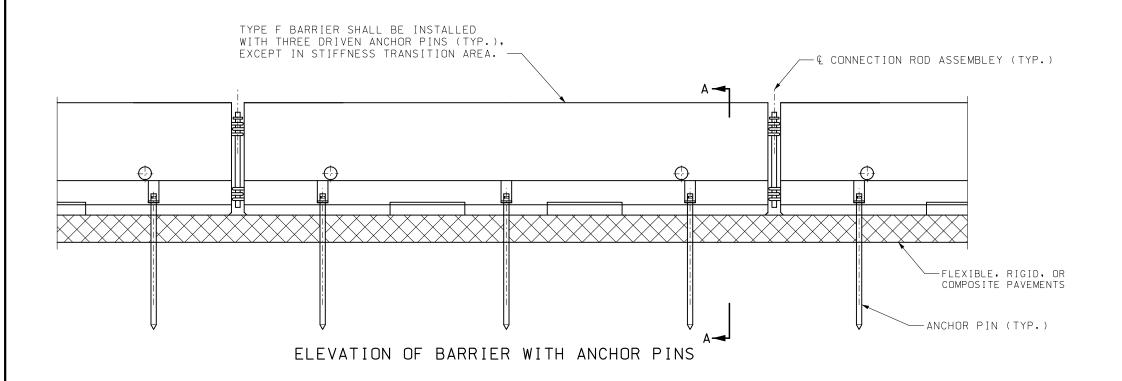
## TEMPORARY CONCRETE TRAFFIC BARRIER

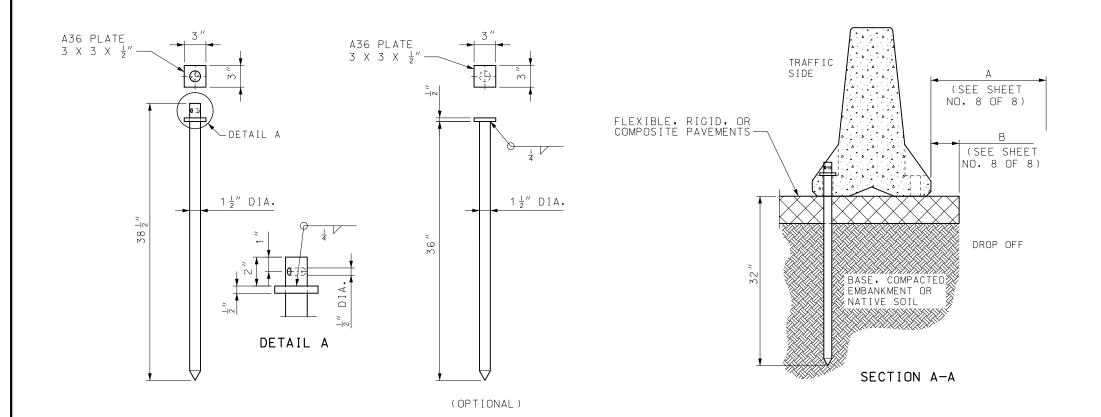
ANCHORED (BOLT SYSTEM)

DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

617.20F

SHEET NO. 6 OF 8





DRIVEN ANCHOR PIN (A36)

GENERAL NOTES:

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

WHERE EXISTING FLEXIBLE PAVEMENT OR RIGID PAVEMENT IS NOT PRESENT A 2" THICK X 30" WIDE MINIMUM ASPHALT PAD SHALL BE CONSTRUCTED.

COST OF FURNISHING AND INSTALLING THE ASPHALT PAD COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR PINS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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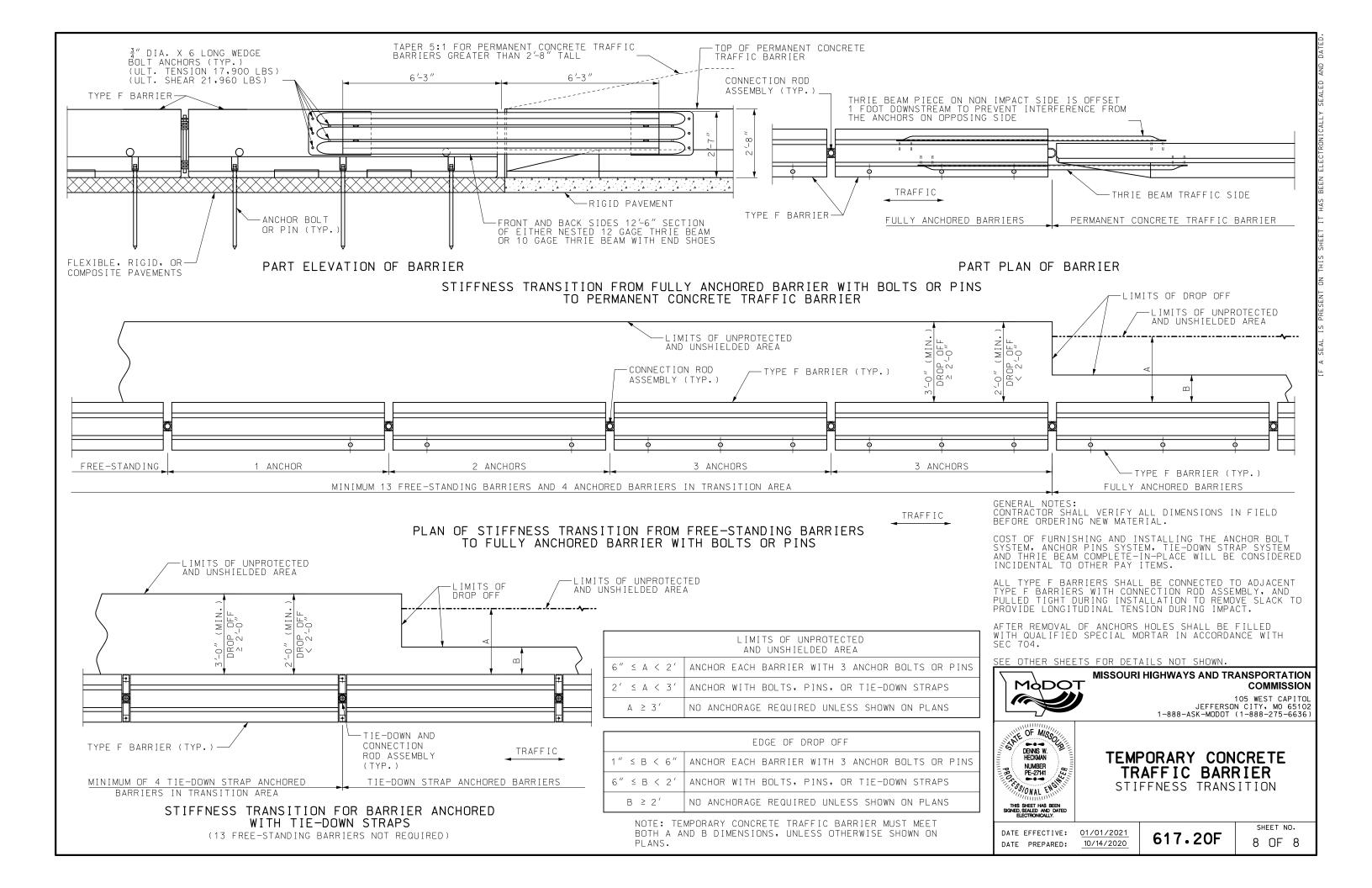
## TEMPORARY CONCRETE TRAFFIC BARRIER

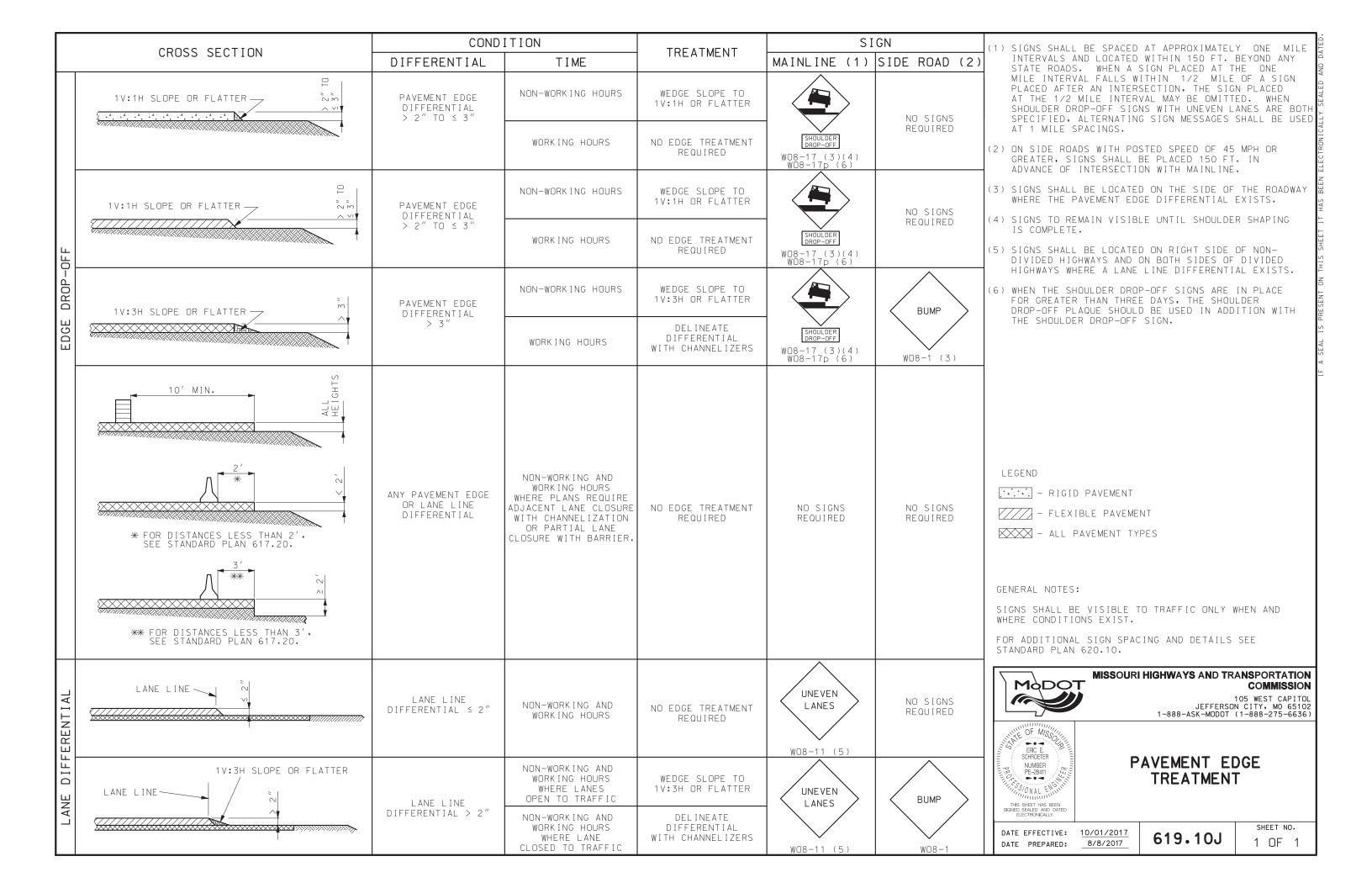
**ANCHORED** (PIN SYSTEM)

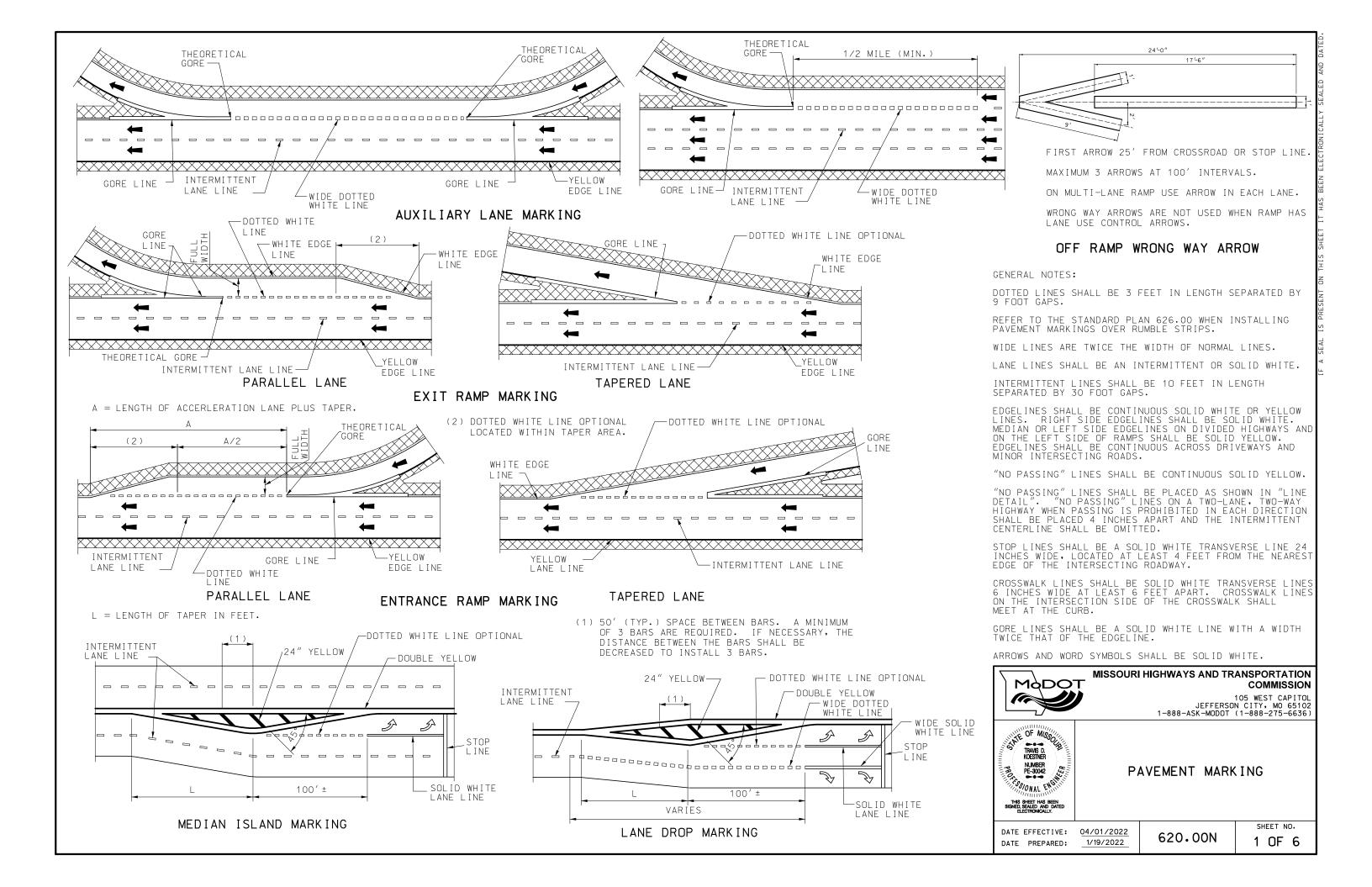
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

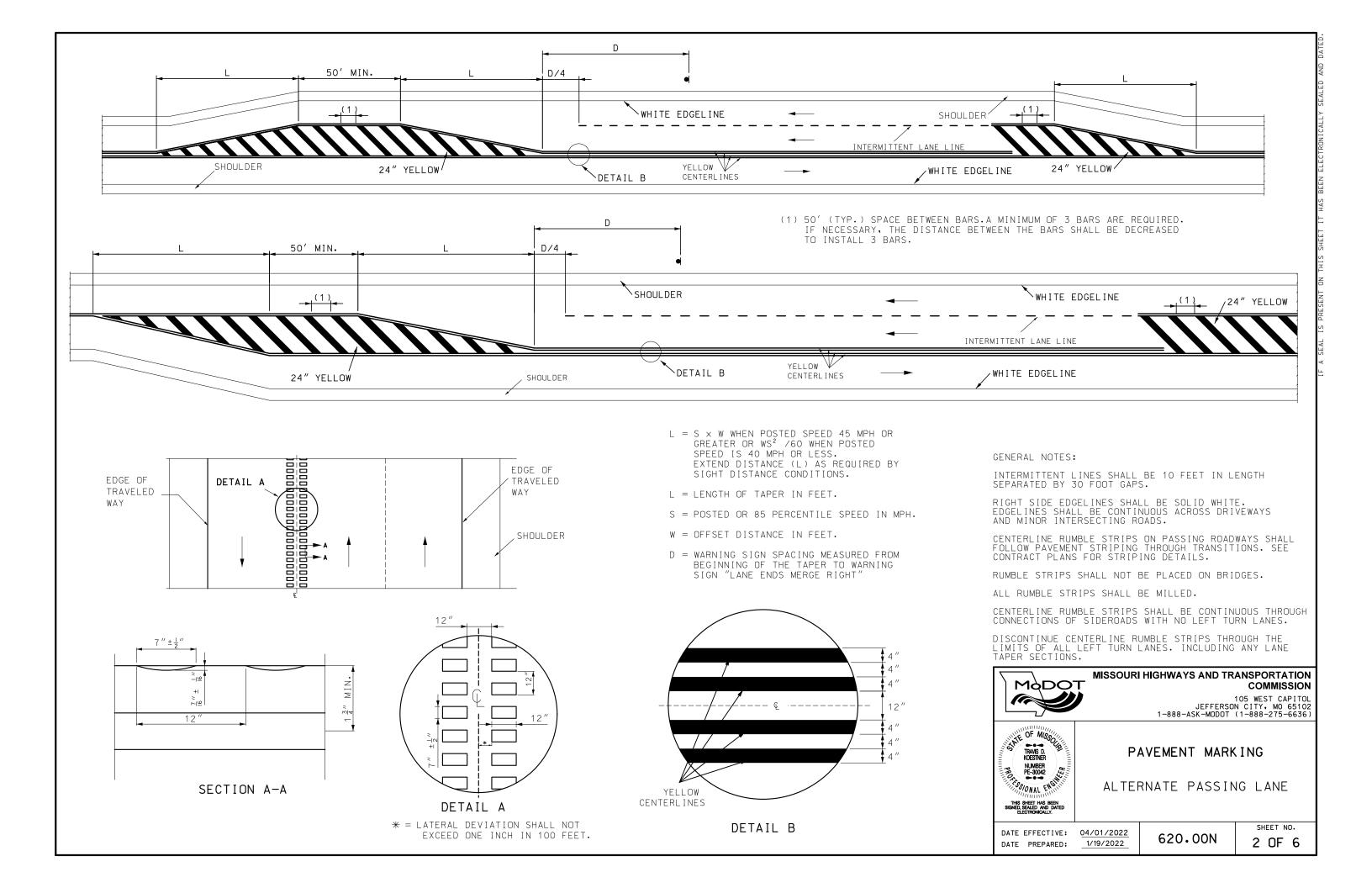
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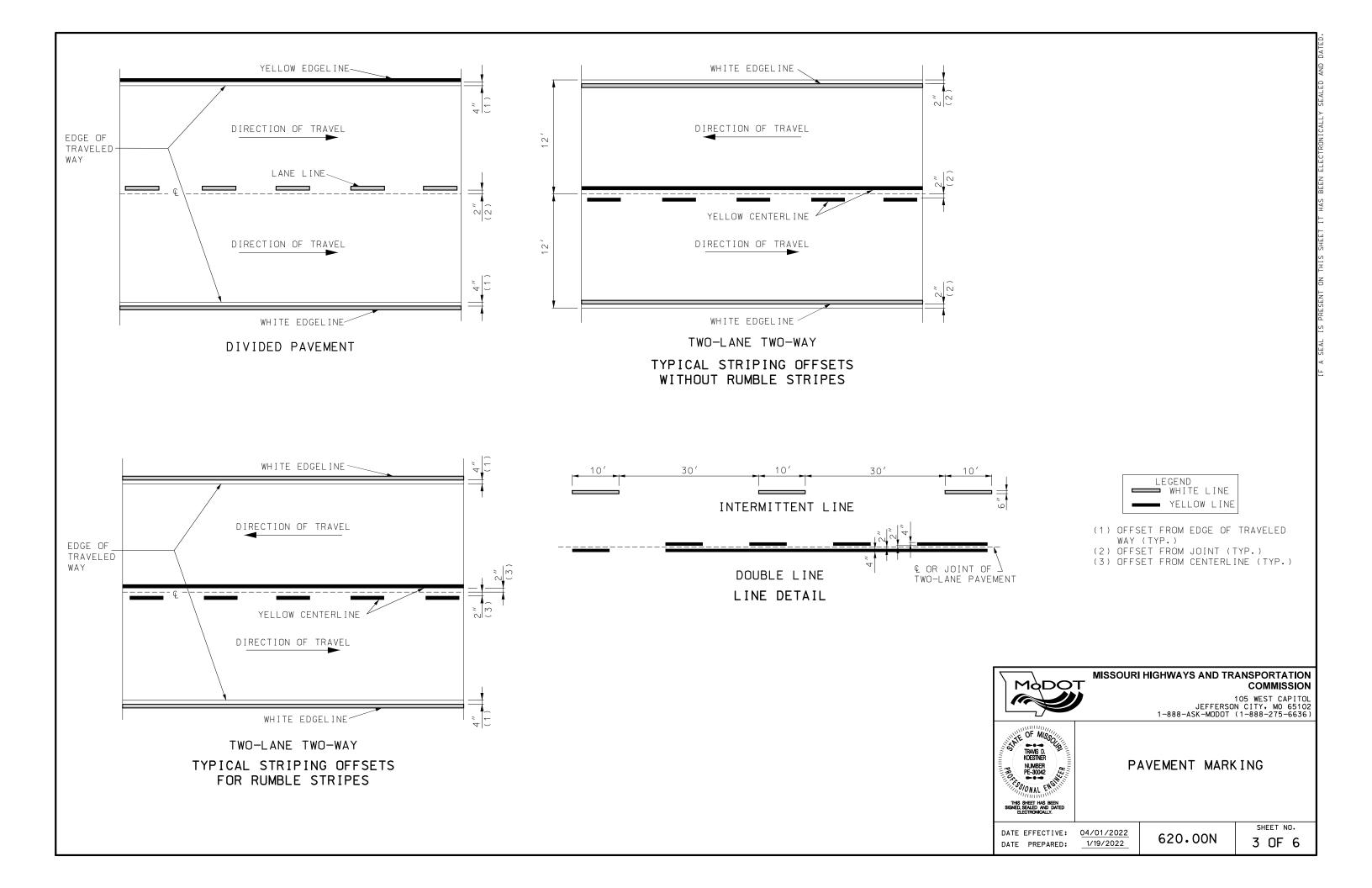
SHEET NO. 7 OF 8

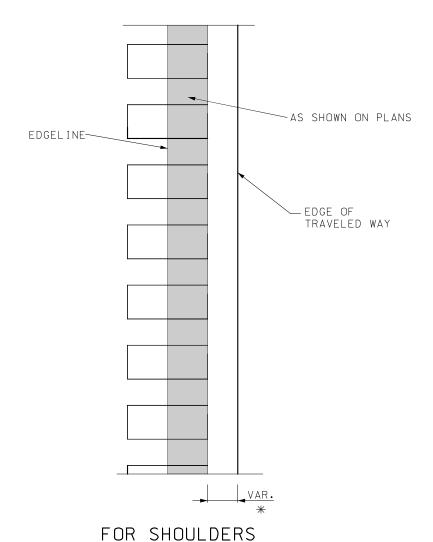


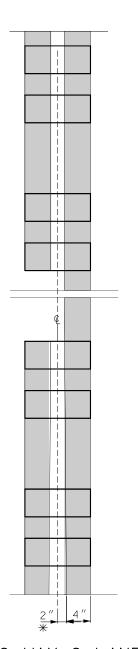












2 WAY 2 LANE (SEE TYPICAL STRIPING FOR RUMBLESTRIPS)



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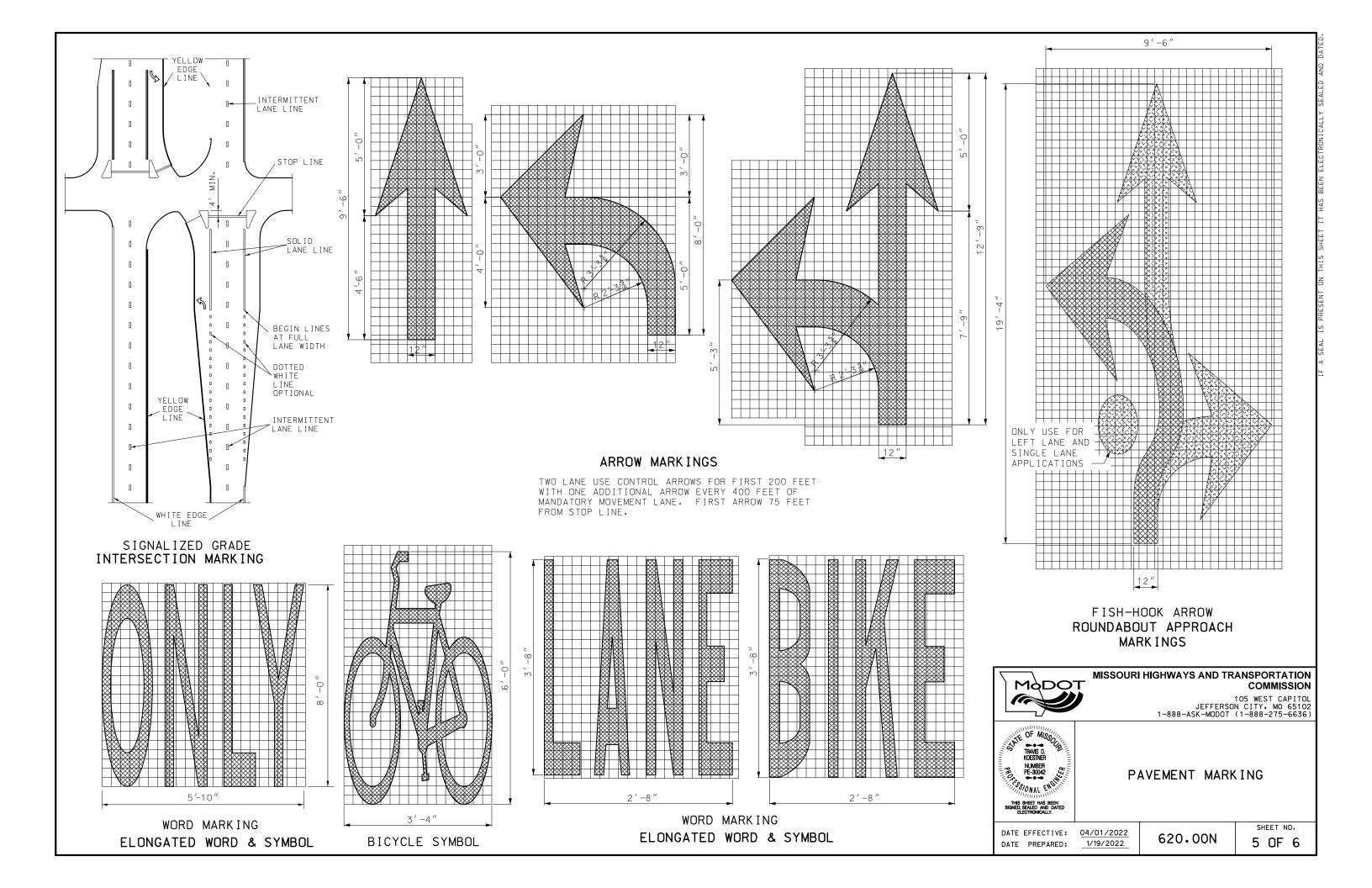


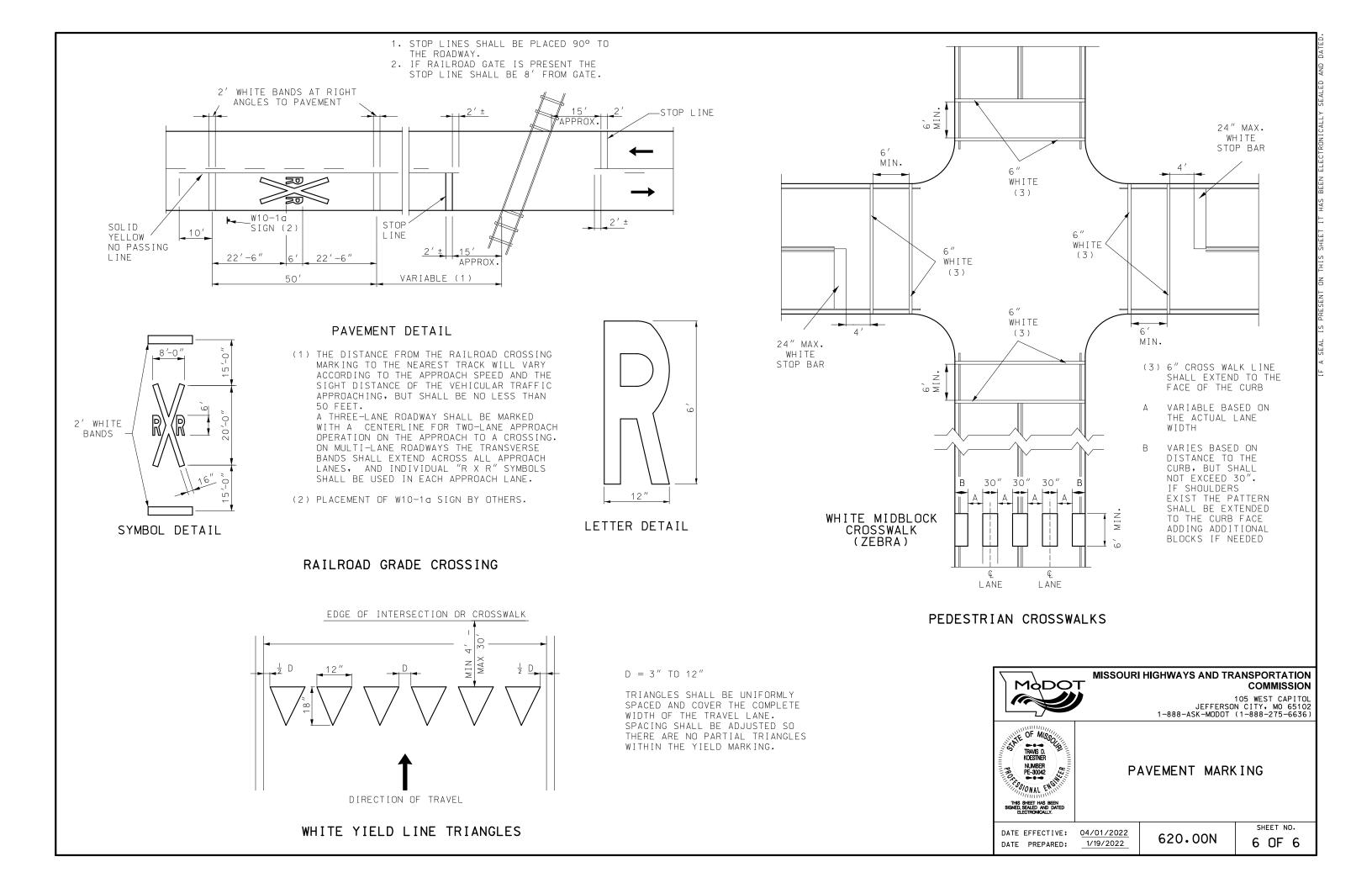
PAVEMENT MARKING STRIPING THROUGH RUMBLE STRIPS

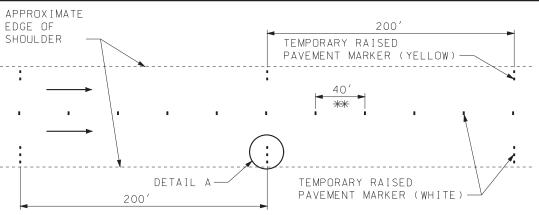
DATE EFFECTIVE: 04/01/2022 DATE PREPARED: 1/19/2022

620.00N

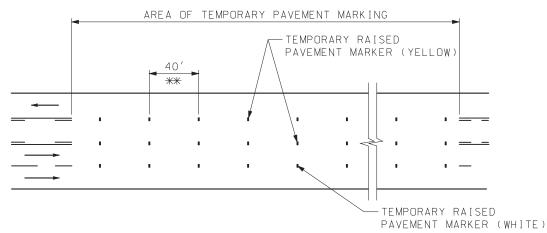
SHEET NO. 4 OF 6



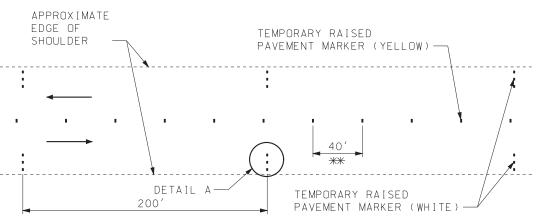




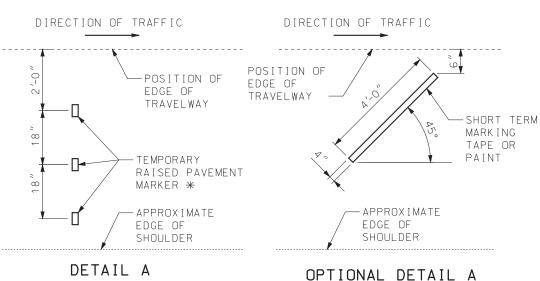
EDGE LINES AND LANE LINES ON MULTILANE DIVIDED SECTIONS



TWO-WAY WITH LEFT-TURN LANE MARKING SECTION

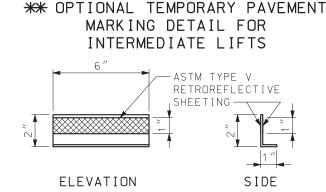


EDGE LINES AND CENTERLINE ON TWO-WAY SECTIONS WITH PAVED SHOULDERS GREATER THAN 4 FEET WIDE



FOR INTERMEDIATE LIFT

ON TWO-WAY SECTIONS WITH OR NO SHOULDERS



36′

TAPE OR PAINT -

4" WIDE SHORT TERM

TYPICAL TEMPORARY RAISED PAVEMENT MARKER DETAIL

GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IS REQUIRED WHEN 200 CONSECUTIVE LINEAR FEET OR MORE OF PERMANENT PAVEMENT MARKING HAS BEEN OBLITERATED, OR AS DIRECTED BY THE ENGINEER.

TEMPORARY RAISED PAVEMENT MARKERS (TRPMS), OR THE OPTIONAL 4"X 4' SHORT TERM TAPE OR PAINT, WHEN ALLOWED, SHALL BE MAINTAINED IN PLACE AND RETROREFLECTIVE UNTIL THE PERMANENT PAVEMENT MARKINGS ARE INSTALLED. MISSING OR NON-REFLECTIVE MARKINGS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE COMMISSION WHEN 10% OR MORE ARE DEFICIENT WITHIN ONE MILE OR WHEN 4 OR MORE CONSECUTIVE MARKINGS ARE DEFICIENT.

FOR INTERMEDIATE LIFTS, 4"X 4' SHORT TERM TAPE OR TEMPORARY PAINT MAY BE USED IN LIEU OF TRPMS.

TRPMS USED ON INTERMEDIATE LIFTS SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEXT LIFT.

ALL TEMPORARY MARKINGS SHALL BE REMOVED BY THE CONTRACTOR AFTER INSTALLATION OF PERMANENT MARKINGS, EXCEPT WHEN PERMANENT MARKINGS ARE TO BE INSTALLED BY OTHERS.

TEMPORARY TAPE SHALL NOT BE USED FOR TEMPORARY MARKING ON THE FINAL SURFACE EXCEPT WHEN SPECIFIED IN THE PLANS.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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TEMPORARY PAVEMENT MARK ING TEMPORARY PAVEMENT MARKING

DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

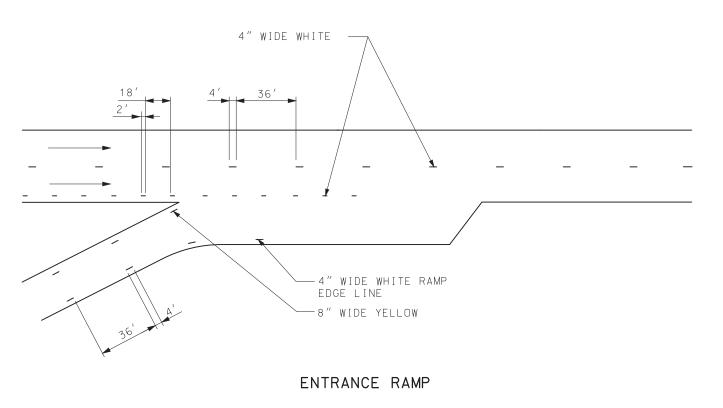
620.10G

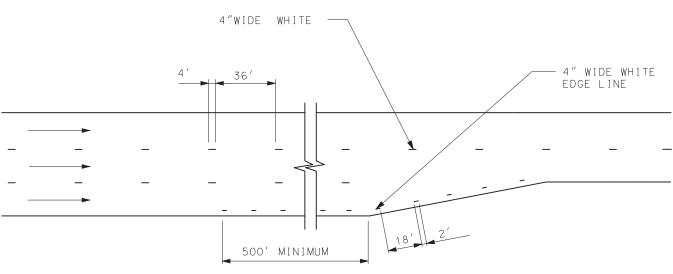
SHEET NO. 1 OF 5

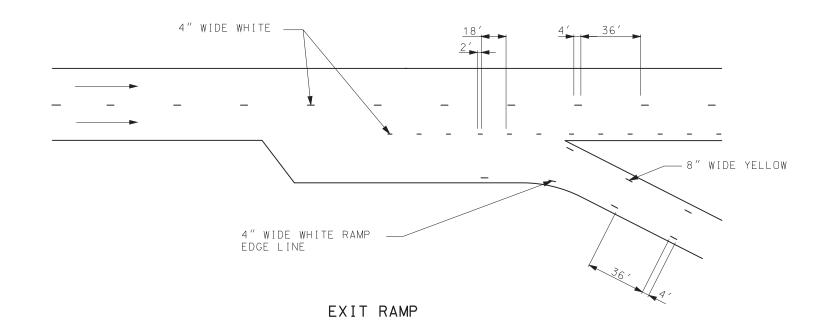
\* THREE TEMPORARY RAISED PAVEMENT MARKERS SHALL BE USED IF SHOULDER IS 6'OR WIDER. OTHERWISE, USE TWO TEMPORARY RAISED PAVEMENT MARKERS.

TEMPORARY RAISED APPROXIMATE EDGE PAVEMENT MARKER (YELLOW) OF SHOULDER 40' \*\* TEMPORARY RAISED PAVEMENT MARKER (WHITE)

EDGE LINES AND CENTERLINE PAVED SHOULDERS 4 FEET WIDE OR LESS, AGGREGATE OR EARTH SHOULDERS







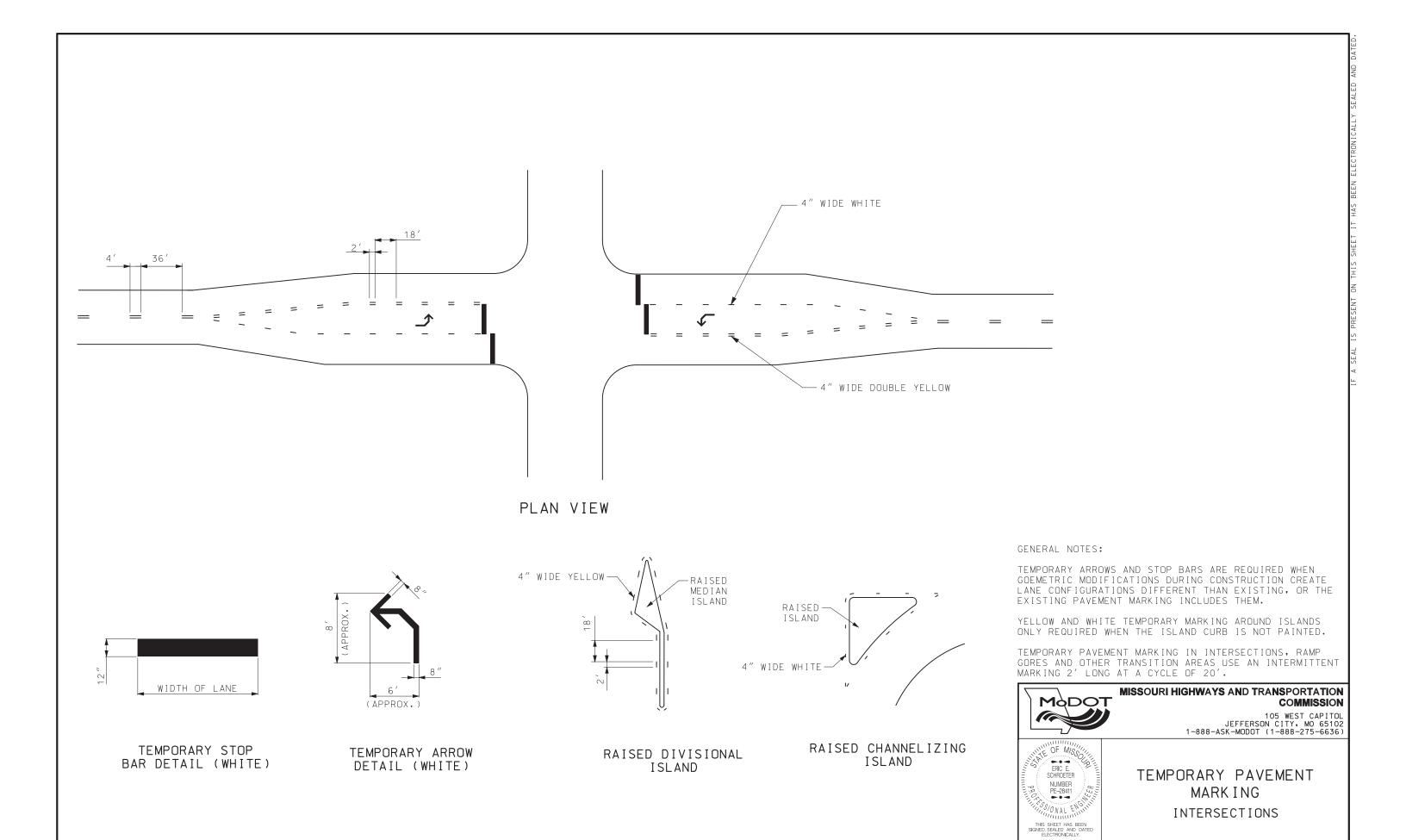
# LANE TRANSITION

# GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMPS GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING OF 2 FEET LONG AT A CYCLE OF 20 FEET.

LIMITS OF TEPORARY GORE MARKING ARE THE SAME AS THE EXISTING GORE LINES.





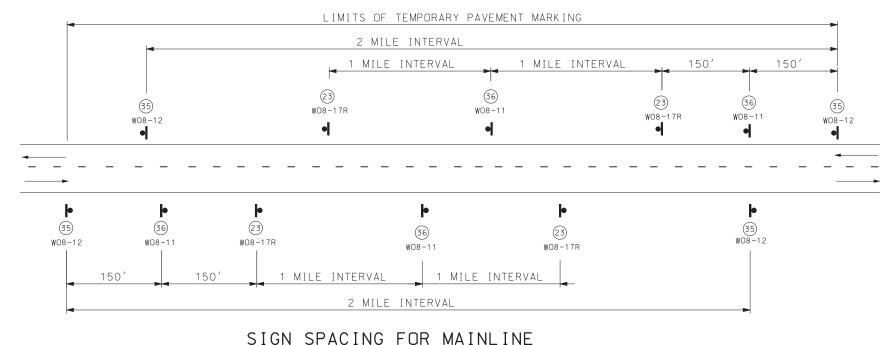
SHEET NO.

3 OF 5

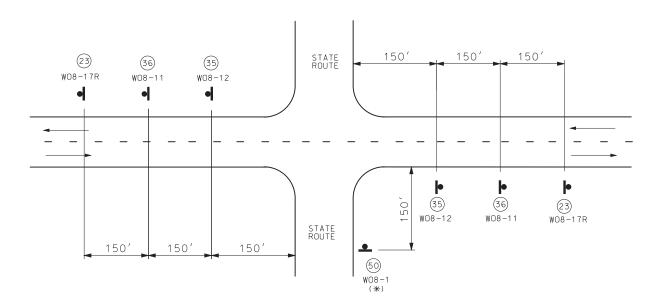
620.10G

DATE EFFECTIVE: 07/01/2017

DATE PREPARED: 5/1/2017



# (DETAIL SHOWN IS BASED ON A PROJECT MEETING ALL CONDITIONS: NO CENTER STRIPE, UNEVEN LANES, SHOULDER DROP-OFF AND BUMP.) WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGHS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXIST. IF ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF). THE SIGN SPACING SHALL BE AT 1 MILE INTERVALS.



# SIGN SPACING AT STATE ROUTE INTERSECTIONS

(\*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



GENERAL NOTES:

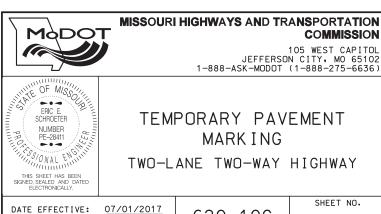
FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

SIGN (35) AND TEMPORARY PAVEMENT MARKING INSTALLED WHERE CENTERLINE STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING HAS BEEN INSTALLED.

SIGN (35) IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

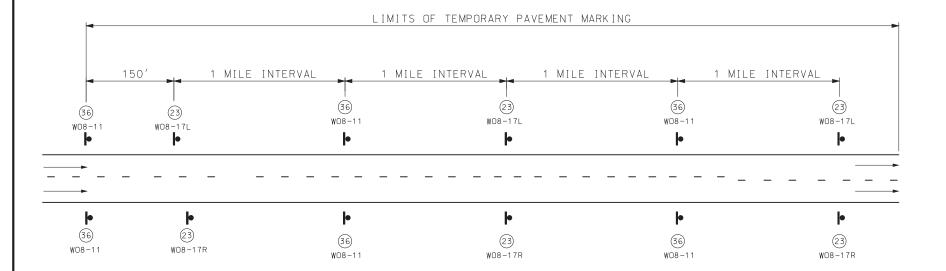
WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.



DATE PREPARED: 5/1/2017

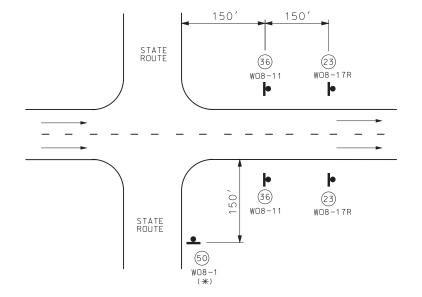
620.10G

4 OF 5



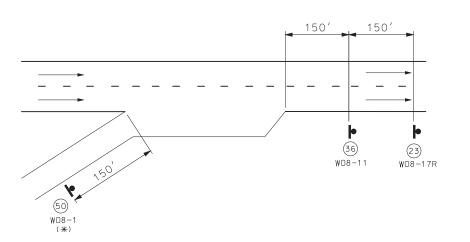
# SIGN SPACING FOR DIVIDED OR MULTI-LANE HIGHWAY

(DETAIL SHOWN IS BASED ON A PROJECT MEETING CONDITIONS OF UNEVEN LANES AND SHOULDER DROP-OFF.) WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXISTS. WHEN ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF). SIGN SPACING SHALL BE AT 1 MILE INTERVALS



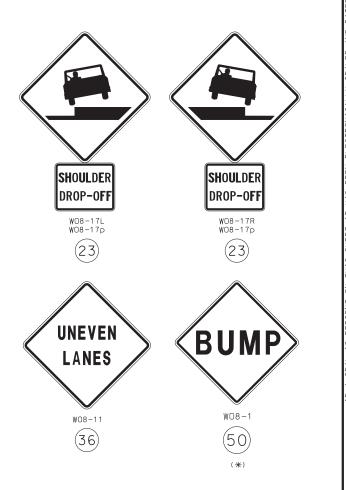
# SIGN SPACING AT STATE ROUTE INTERSECTIONS

(\*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



# SIGN SPACING AT RAMPS

(\*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



GENERAL NOTES:

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLANS 616.10 AND 903.03.

WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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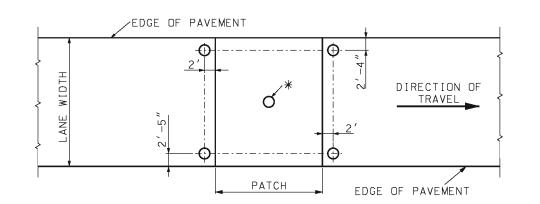


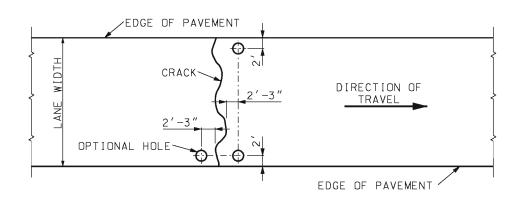
TEMPORARY PAVEMENT MARK ING DIVIDED AND MULTI-LANE HIGHWAYS

DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017

620.10G

SHEET NO. 5 OF 5

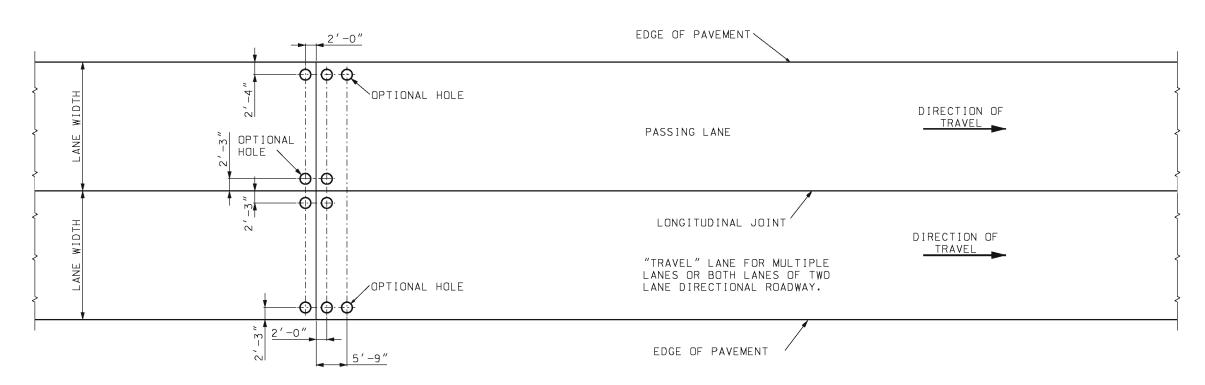




**PATCH** 

\* THIS HOLE SHOULD ONLY BE USED ON PATCHES EXISTING PRIOR TO CONSTRUCTION. THE HOLE SHOULD BE LOCATED CLOSE TO THE CENTER OF THE PATCH. BY USING THIS HOLE, THE TWO HOLES LOCATED AT THE SHOULDER COULD BE ELIMINATED.

CRACK



JOINT



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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KATHRYN PHILLIPS HARVEY NUMBER PE-23751

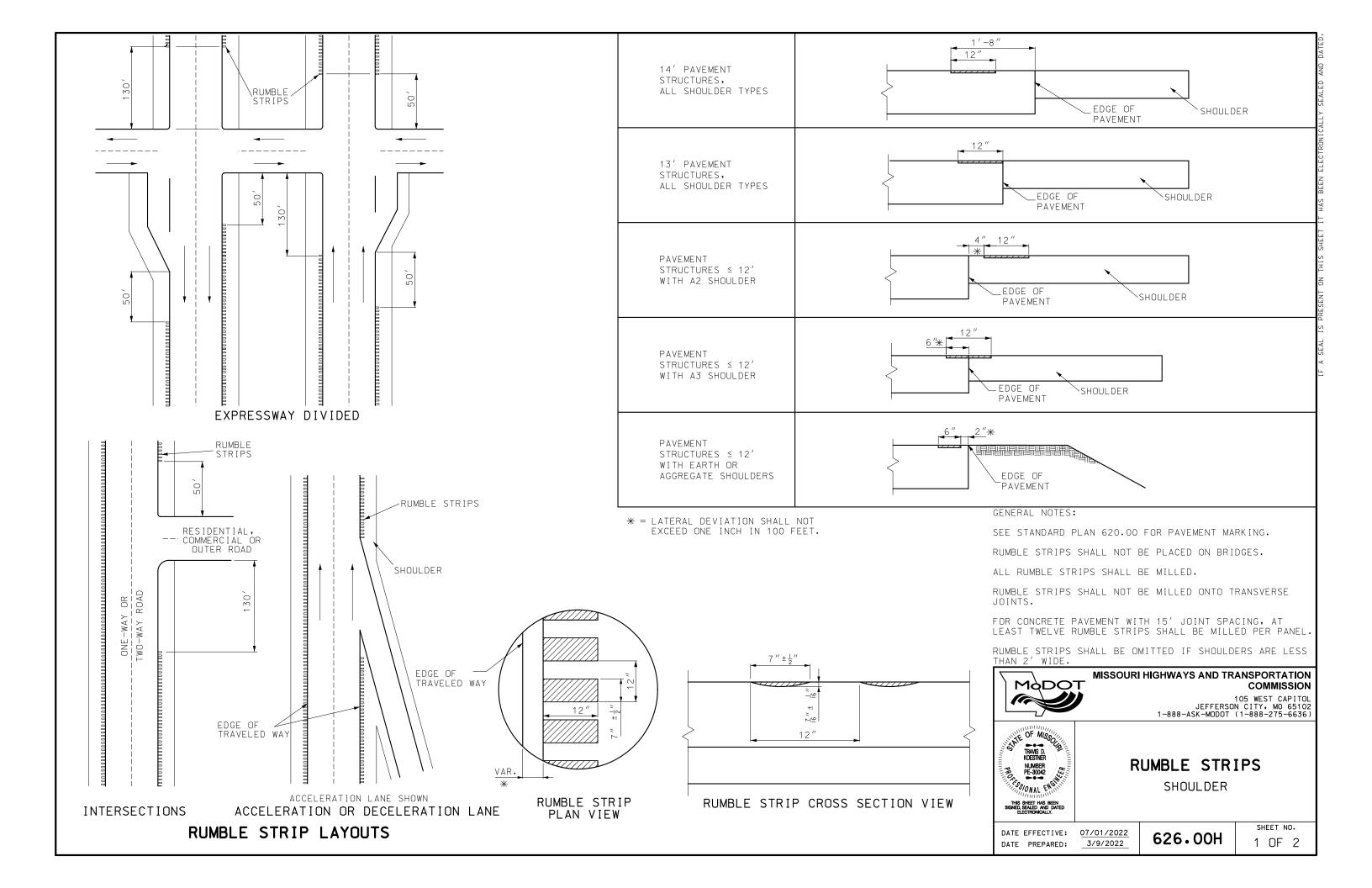
HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION

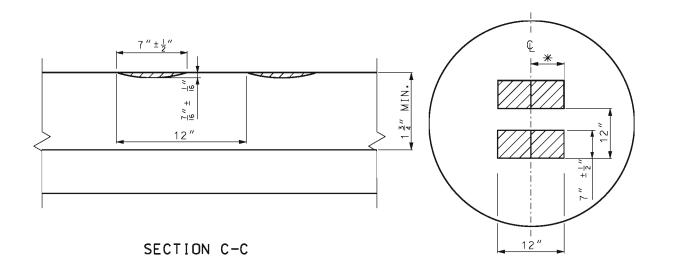
DATE EFFECTIVE: 10/01/1998 DATE PREPARED:

8/21/2009

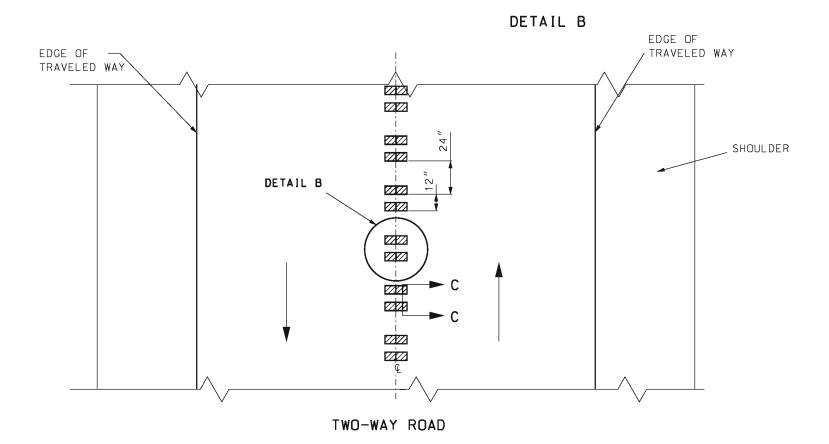
625.00

SHEET NO. 1 OF 1





\* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.



GENERAL NOTES:

SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.

RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

ALL RUMBLE STRIPS SHALL BE MILLED.

CENTERLINE RUMBLE STRIPS SHALL BE CONTINUOUS THROUGH CONNECTIONS OF SIDEROADS WITH NO LEFT TURN LANES.

DISCONTINUE CENTERLINE RUMBLE STRIPS THROUGH THE LIMITS OF ALL LEFT TURN LANES, INCLUDING ANY LANE TAPER SECTIONS.



### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

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# RUMBLE STRIPS

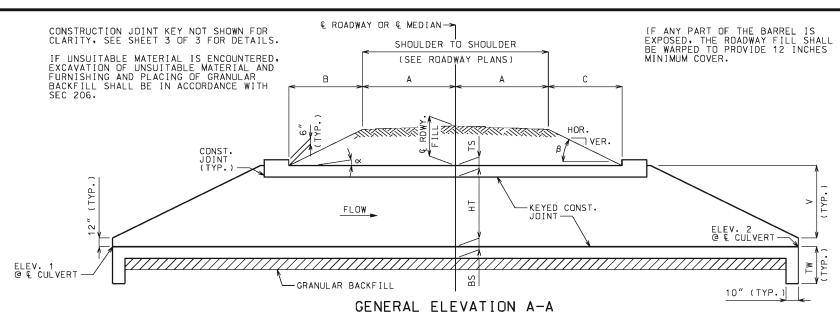
**CENTERLINE** 

DATE EFFECTIVE: 04/01/2009 DATE PREPARED: 2/20/2009

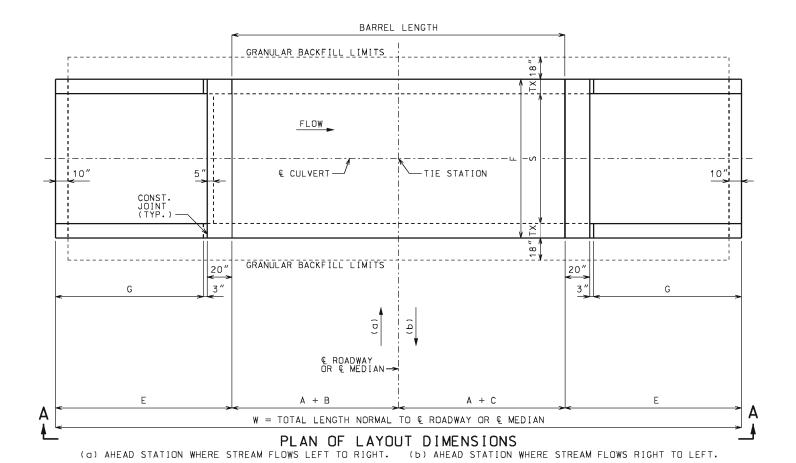
626.00H

SHEET NO.

2 OF 2



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPÉRED TO MATCH CULVERT OPENINGS.



# EQUATIONS FOR COMPUTING $\propto$ , $\beta$ , B AND C

∝ = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO € ROADWAY OR € MEDIAN = ARCTAN ( ELEV. 1 - ELEV. 2 `

 $\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\mathfrak L$  ROADWAY OR  $\mathfrak L$  MEDIAN = ARCTAN (VER.)

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = € RDWY. FILL + A(CS) - A(TAN∞) UPSTREAM HEADWALL NORMAL TO € ROADWAY OR € MEDIAN TAN€ + TAN∞

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO =  $\frac{\mathbb{C}}{\mathbb{C}}$  RDWY. FILL + A(CS) + A(TAN $\propto$ ) DOWNSTREAM HEADWALL NORMAL TO  $\mathbb{C}$  ROADWAY OR  $\mathbb{C}$  MEDIAN TAN $\beta$  - TAN $\alpha$ DOWNSTREAM HEADWALL NORMAL TO & ROADWAY OR & MEDIAN

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM & ROADWAY OR & MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN & ROADWAY OR & MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO & ROADWAY OR & MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS. TO ACCOUNT FOR A VARYING PROFILE GRADE THE & ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAY	OUT DIMENSIONS
VARIABLE	DIMENSION
×	SEE EQUATIONS
β	SEE EQUATIONS
В	SEE EQUATIONS
С	SEE EQUATIONS
E	G + 23"
F	S + 2TX
G	2V
٧	HT + TS - 12"
W	2A + B + C + 2E
ΤW	MAX{3'-4" OR (BS + 12")}

# **GENERAL NOTES:**

### DESIGN SPECIFICATIONS:

2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EOUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

### MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# **CONCRETE** SINGLE BOX CULVERT

SKEW: SQUARED WINGS: STRAIGHT

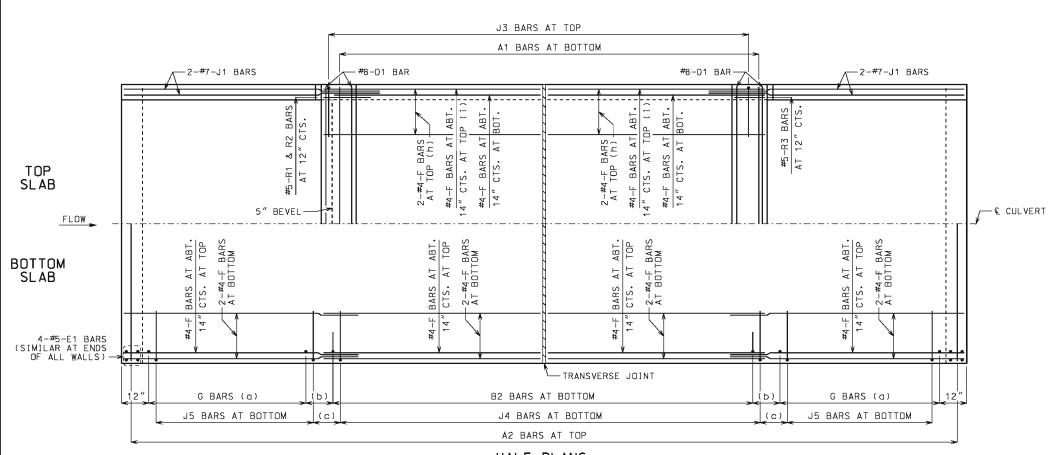
LAYOUT

DATE EFFECTIVE: DATE PREPARED:

07/01/2015 5/13/2015

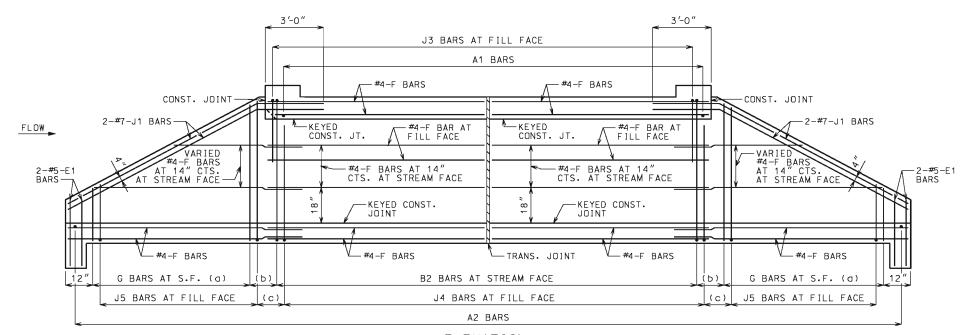
703.10J

SHEET NO. 1 OF 3



### HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT & CULVERT.



## ELEVATION

J1 BARS MAY BE BENT IN FIELD OR SHOP.

# LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES. 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) NOT SPECIFIED ON THIS SHEET
- (e) NOT SPECIFIED ON THIS SHEET
- (f) NOT SPECIFIED ON THIS SHEET
- (g) NOT SPECIFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



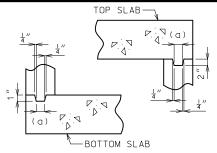
# CONCRETE SINGLE BOX CULVERT

SKEW: SQUARED WINGS: STRAIGHT

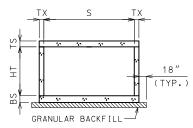
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 07/01/2015 5/13/2015 703.10J

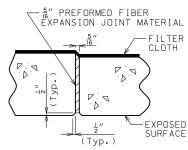
10J SHEET NO. 2 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



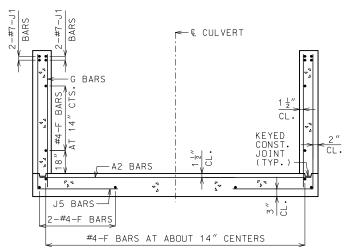
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



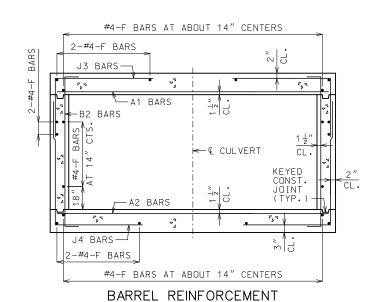
# TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

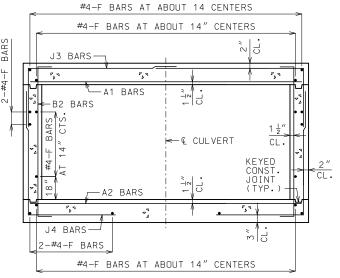
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



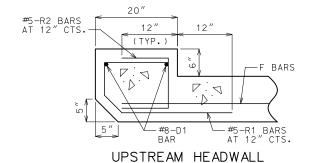
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



REINFORCEMENT

# GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT, HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT SKEW: SQUARED

WINGS: STRAIGHT

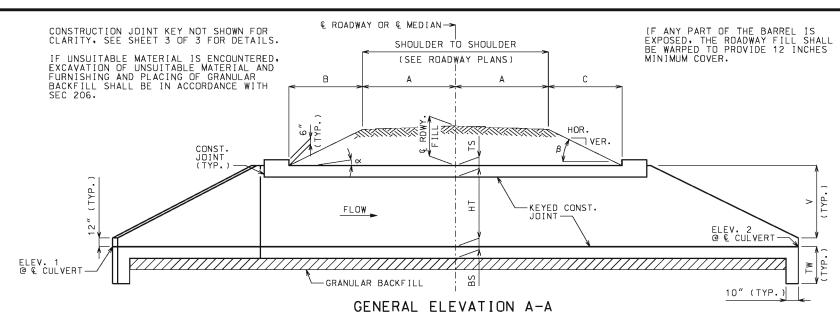
CONCRETE

SECTIONS

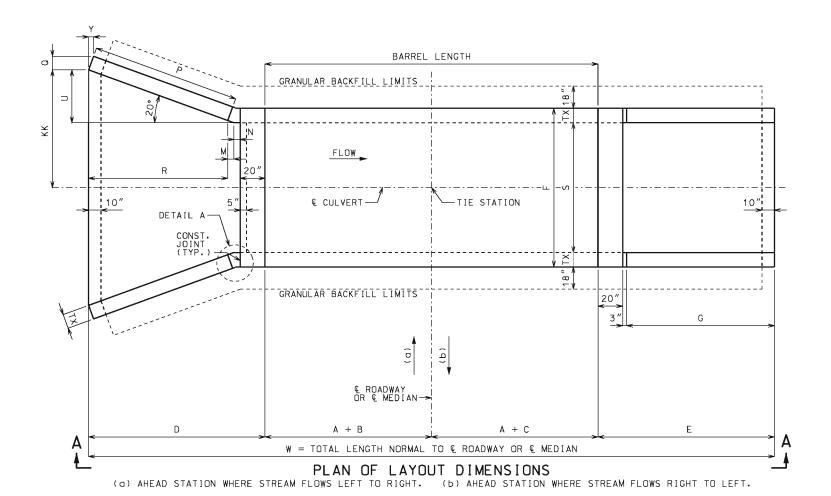
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020 70

703.10J

10J SHEET NO. 3 OF 3



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPÉRED TO MATCH CULVERT OPENINGS.



# EQUATIONS FOR COMPUTING $\propto$ , $\beta$ , B AND C

- ∝ = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO € ROADWAY OR € MEDIAN = ARCTAN ( ELEV. 1 ELEV. 2 `
- $\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\mathfrak L$  ROADWAY OR  $\mathfrak L$  MEDIAN = ARCTAN (VER.)
- B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = € RDWY. FILL + A(CS) A(TAN∞) UPSTREAM HEADWALL NORMAL TO € ROADWAY OR € MEDIAN TAN€ + TAN∞
- C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO =  $\frac{c}{c}$  RDWY. Fill + A(CS) + A(TAN $\propto$ )

  TAN $\beta$  TAN $\propto$ DOWNSTREAM HEADWALL NORMAL TO & ROADWAY OR & MEDIAN
- CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM & ROADWAY OR & MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN & ROADWAY OR & MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO & ROADWAY OR & MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE & ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

	LAYOUT DI	MENSI	ONS
VARIABLE	DIMENSION	VARIABLE	DIMENSIÓN
×	SEE EQUATIONS	Р	2V(SEC 20°)
β	SEE EQUATIONS	Q	TX(COS 20°)
В	SEE EQUATIONS	R	P(COS 20°)
С	SEE EQUATIONS	U	(R + M)(TAN 20°)
D	R + M + N + 20"	٧	HT + TS - 12"
E	G + 23"	W	2A + B + C + D + E
F	S + 2TX	Y	TX(SIN 20°)
G	2V	KK	S/2 + U
М	N(COS 20°)	Т₩	MAX{3'-4" OR (BS + 12")}
N	3" + TX(TAN 10°)		

# **GENERAL NOTES:**

DESIGN SPECIFICATIONS:

2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EOUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



- CONST

DETAIL A

JOINT

# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

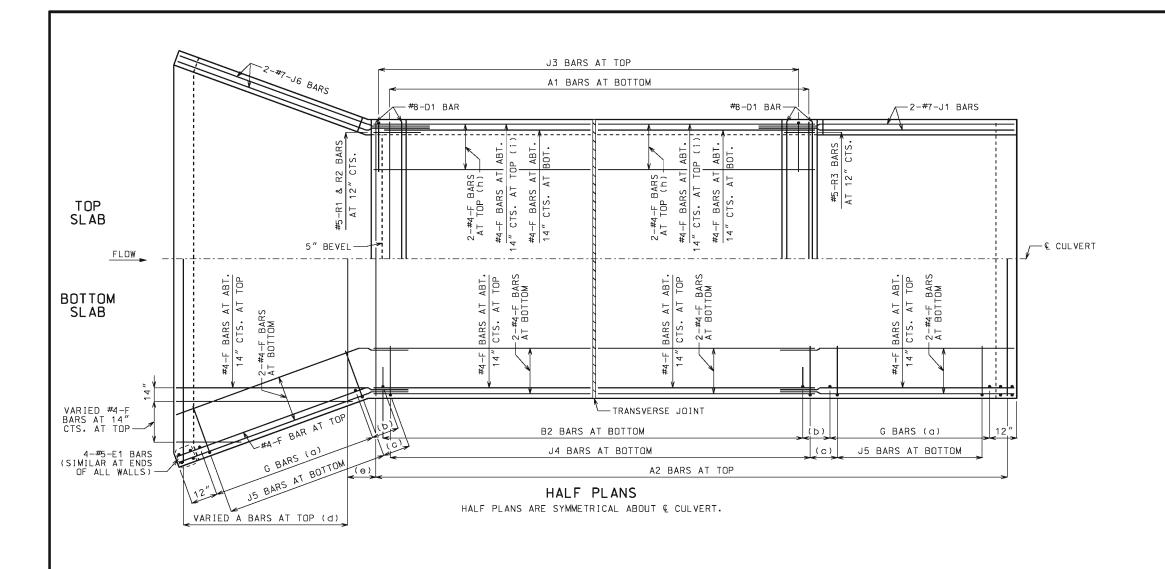
SKEW: SQUARED WINGS: FLARED

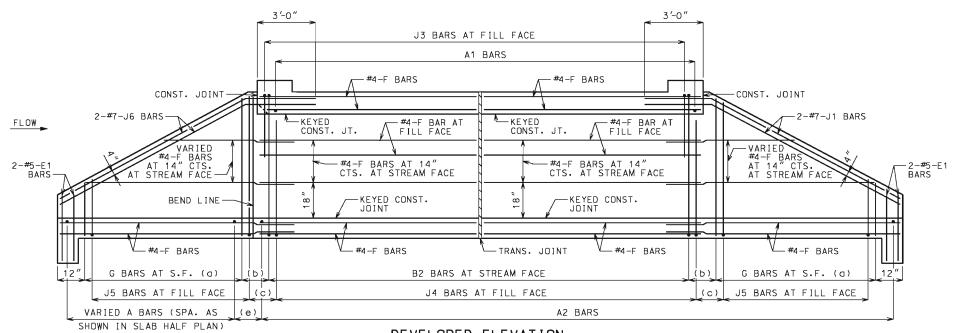
LAYOUT

DATE EFFECTIVE: DATE PREPARED: 07/01/2015 5/13/2015

SHEET NO. 1 OF 3

703.11J





# DEVELOPED ELEVATION

J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

# LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS B2 BARS
- (e) A2 BAR SPACING
- (f) NOT SPECIFIED ON THIS SHEET
- (g) NOT SPECIFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

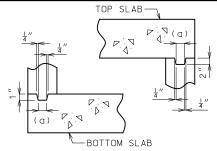
SKEW: SQUARED WINGS: FLARED

REINFORCEMENT

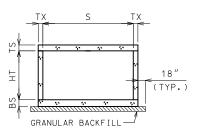
DATE EFFECTIVE: DATE PREPARED: 07/01/2015 5/13/2015

703.11J

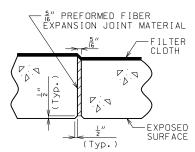
SHEET NO. 2 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE—THIRD OF WALL THICKNESS



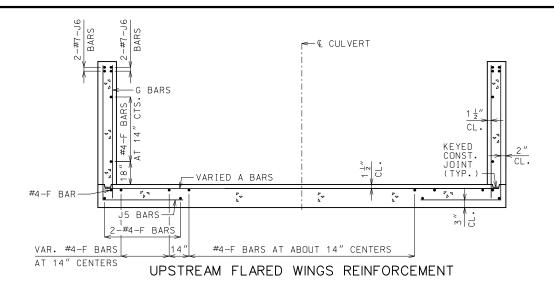
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

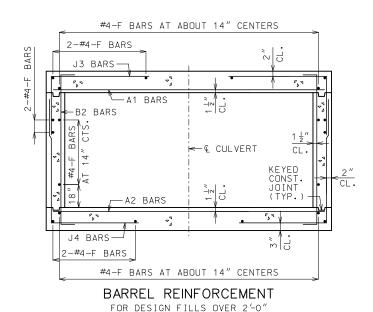


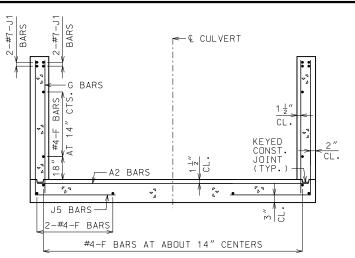
# TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

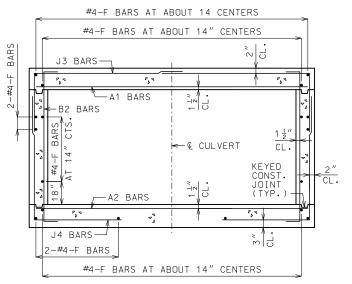
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



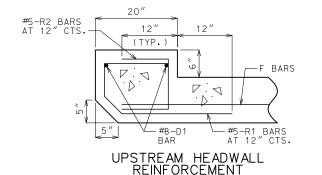




DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



#5-R3 BARS
AT 12" CTS.

F BARS

WH8-D1 BAR

DOWNSTREAM HEADWALL
REINFORCEMENT

# GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO & CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT

CONCRETE

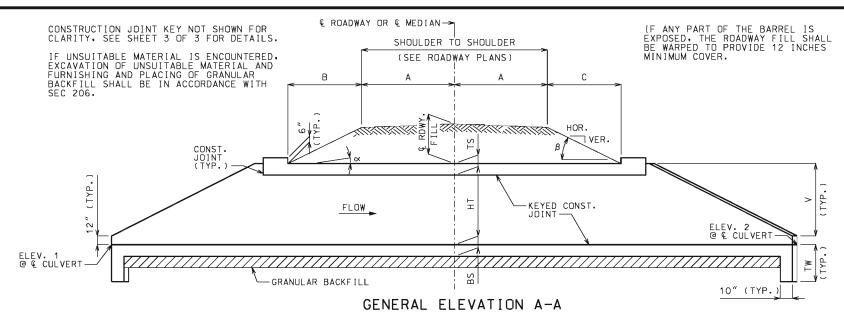
SKEW: SQUARED WINGS: FLARED

SECTIONS

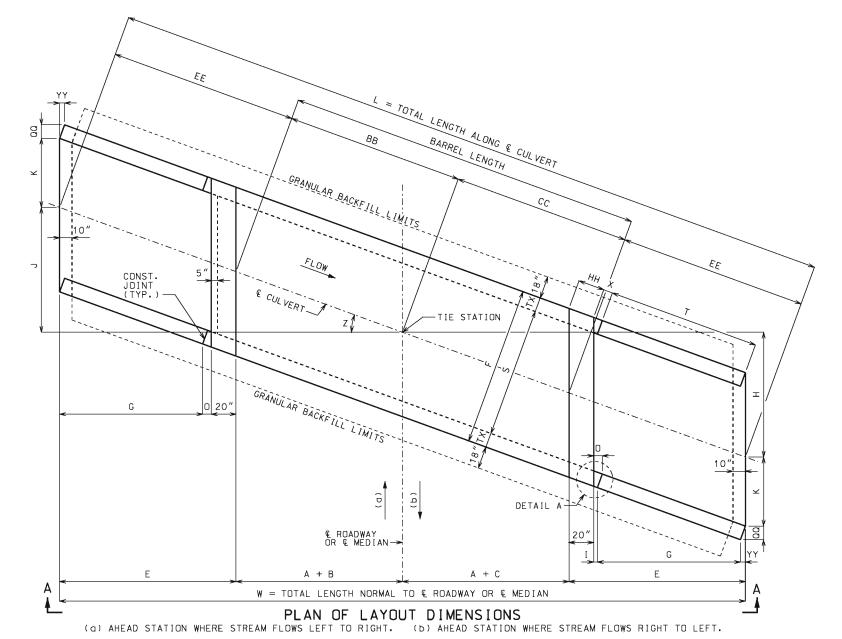
DATE EFFECTIVE:
DATE PREPARED:

01/01/2021 10/14/2020 703.11J

SHEET NO. 3 OF 3



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



# EQUATIONS FOR COMPUTING $\propto$ , $\beta$ , B AND C

- ∝ = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO € ROADWAY OR € MEDIAN = ARCTAN ( ELEV. 1 ELEV. 2 `
- $\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\mathfrak L$  ROADWAY OR  $\mathfrak L$  MEDIAN = ARCTAN (VER.)
- B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = € RDWY. FILL + A(CS) A(TAN∞) UPSTREAM HEADWALL NORMAL TO € ROADWAY OR € MEDIAN TAN€ + TAN∞
- C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO = \(\begin{array}{c} \text{RDWY.} \ FILL + A(CS) + A(TAN\alpha) \\
  \text{TAN\beta} TAN\beta TAN\alpha \\
  \text{TAN\beta} TAN\beta TAN\alpha \\
  \text{TAN\beta} TAN\alpha TAN\a DOWNSTREAM HEADWALL NORMAL TO & ROADWAY OR & MEDIAN
- CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM & ROADWAY OR & MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN & ROADWAY OR & MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO & ROADWAY OR & MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS. TO ACCOUNT FOR A VARYING PROFILE GRADE THE & ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

	LAYOUT DI	MENS I	ONS
VARIABLE	DIMENSION	VARIABLE	DIMENSION
×	SEE EQUATIONS	Т	G(SEC Z)
β	SEE EQUATIONS	٧	HT + TS - 12"
В	SEE EQUATIONS	₩	2A + B + C + 2E
С	SEE EQUATIONS	Х	3" + TX(TAN Z)
E	G + O + 20"	Z	SKEW ANGLE
F	S + 2TX	BB	(A + B)(SEC Z)
G	2V	СС	(A + C)(SEC Z)
Н	(A + C + E)(TAN Z)	EE	E(SEC Z)
I	3"(COS Z)	НН	20"(SEC Z)
J	(A + B + E)(TAN Z)	۵۵	TX(COS Z)
K	S(SEC Z)/2	YY	TX(SIN Z)
L	2EE + BB + CC	Τ₩	MAX{3'-4" OR (BS + 12")}
0	I + YY		

# **GENERAL NOTES:**

### DESIGN SPECIFICATIONS:

2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD. EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

### MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

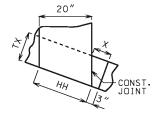
SKEW: LEFT ADVANCE WINGS: STRAIGHT

LAYOUT

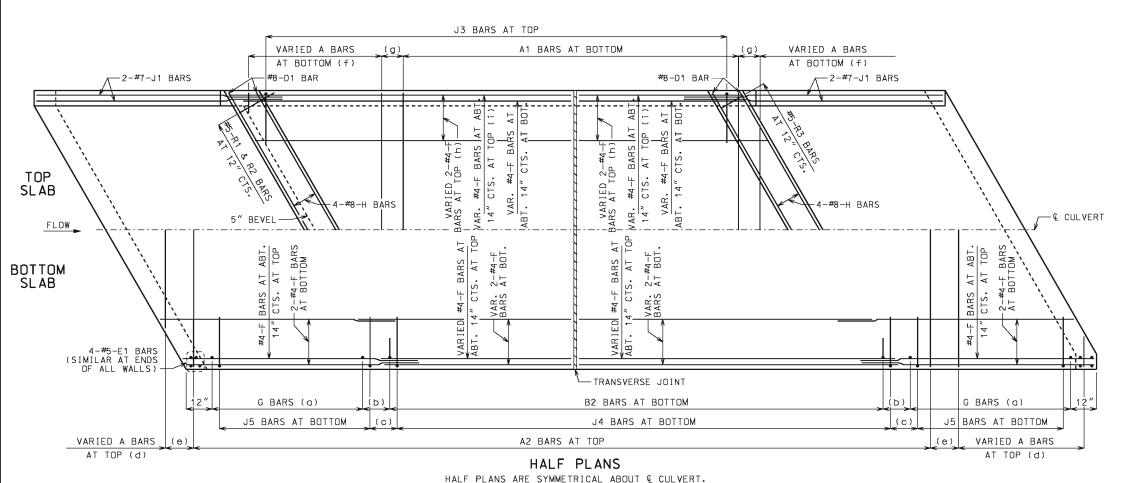
DATE EFFECTIVE: DATE PREPARED: 07/01/2015 5/13/2015

703.12J

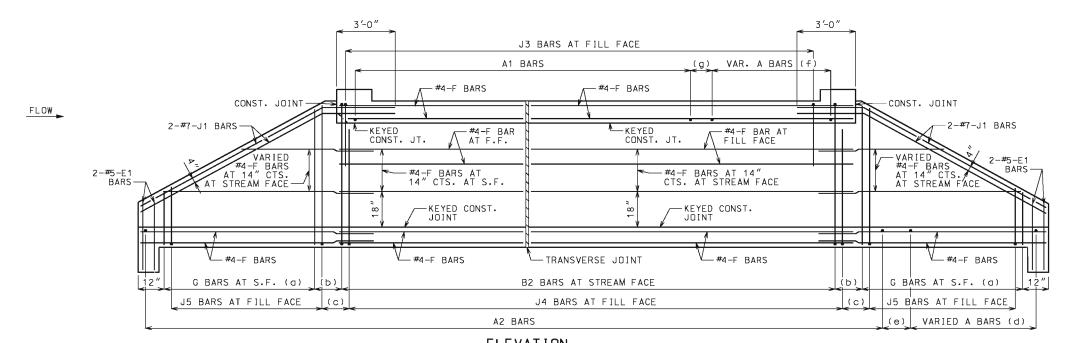
SHEET NO. 1 OF 3



DETAIL A



HALF PLANS ARE SYMMETRICAL ABOUT & CULVERT.



# **ELEVATION**

J1 BARS MAY BE BENT IN FIELD OR SHOP.

# LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: STRAIGHT

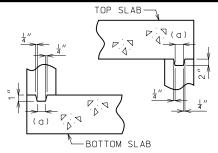
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

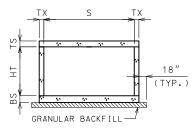
07/01/2015 5/13/2015

703.12J

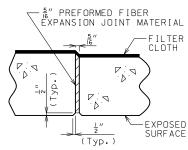
SHEET NO. 2 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



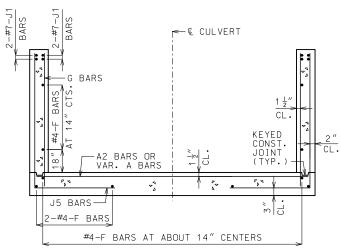
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



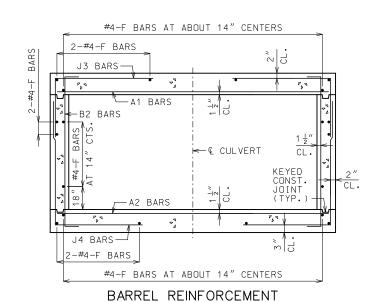
# TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

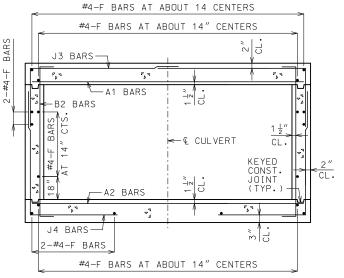
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



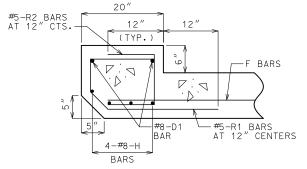
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



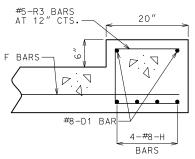
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



DOWNSTREAM HEADWALL REINFORCEMENT

# GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT, HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT SKEW: LEFT ADVANCE

CONCRETE

WINGS: STRAIGHT

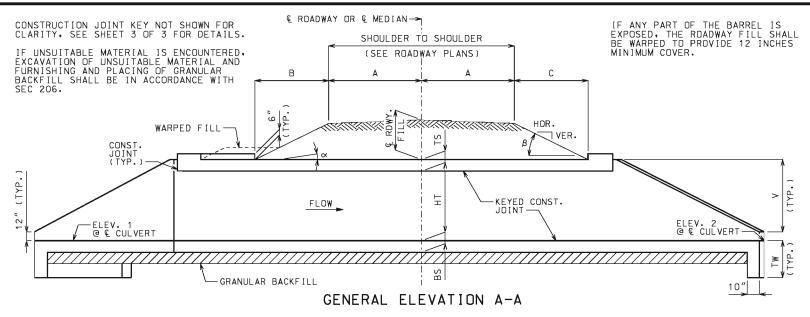
SECTIONS

DATE EFFECTIVE:
DATE PREPARED:

01/01/2021 10/14/2020

703.12J

SHEET NO.



BARREL LENGTH

TIE STATION

DETAIL B

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

CONST. JOINT (TYP.)

ММ

DETAIL A-

DETAIL C

RR

# EQUATIONS FOR COMPUTING $\propto$ , $\beta$ , B AND C

 $\propto$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO & ROADWAY OR & MEDIAN = ARCTAN ( ELEV. 1 - ELEV. 2 \\
\text{LL+A+C+E}

 $\beta$  = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO  $\mathfrak L$  ROADWAY OR  $\mathfrak L$  MEDIAN = ARCTAN (VER.)

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = € RDWY. FILL + A(CS) - A(TAN∞) UPSTREAM HEADWALL NORMAL TO € ROADWAY OR € MEDIAN TAN€ + TAN∞

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO =  $\frac{\mathbb{C}}{\mathbb{C}}$  RDWY. FILL + A(CS) + A(TAN $\propto$ ) DOWNSTREAM HEADWALL NORMAL TO  $\mathbb{C}$  ROADWAY OR  $\mathbb{C}$  MEDIAN TAN $\beta$  - TAN $\propto$ DOWNSTREAM HEADWALL NORMAL TO & ROADWAY OR & MEDIAN

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM & ROADWAY OR & MEDIAN.

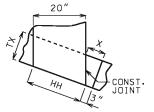
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN & ROADWAY OR & MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO & ROADWAY OR & MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS. TO ACCOUNT FOR A VARYING PROFILE GRADE THE & ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

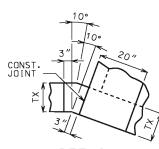
		LAY	OUT DIMENSIONS		
VARIABLE	DIMENSION	VARIABLE	DIMENSION	VARIABLE	DIMENSION
α	SEE EQUATIONS	N	3" + TX(TAN 10")	СС	(A + C)(SEC Z)
β	SEE EQUATIONS	0	I + YY	DD	R + M + N + 20"
В	SEE EQUATIONS	Р	2V[SEC(Z + 20°)]	EE	E(SEC Z)
С	SEE EQUATIONS	Q	TX(COS 20°)	НН	20"(SEC Z)
D	Z ≥ 20°: II + MM + RR	R	P(COS 20°)	ΙΙ	20"(COS Z)
	Z < 20°: II + MM + RR + TT	Т	G(SEC Z)	KK	S/2 + U
E	G + O + 20"	U	(R + M)(TAN 20°)	LL	(AA + BB + DD)(COS Z)
F	S + 2TX	٧	HT + TS - 12"	ММ	3"[COS Z + COS(Z - 20°)]
G	2 V	W	2A + B + C + D + E + SS	QQ	TX(COS Z)
Н	(A + C + E)(TAN Z)	Х	3" + TX(TAN Z)	RR	P[COS (Z - 20°)]
I	3"(COS Z)	Y	TX(SIN 20°)	SS	F(SIN Z)
J	(AA + BB + DD)(SIN Z)	Z	SKEW ANGLE	TT	TX[SIN(20° - Z)]
К	S(SEC Z)/2	AA	F(TAN Z)/2	YY	TX(SIN Z)
L	AA + BB + CC + DD + EE	ВВ	(A + B)(SEC Z)	T₩	MAX{3'-4" OR (BS + 12")}
М	N(COS 20°)		CENEDAL NOTECO		

# RR D

DETAIL C For Z < 20°



DETAIL B



10"

DETAIL A

# **GENERAL NOTES:**

DESIGN SPECIFICATIONS:

2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD. EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.). 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3, FOR SECTION DETAILS, SEE SHEET 3 OF 3, FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

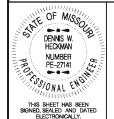
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: FLARED

LAYOUT

DATE EFFECTIVE: DATE PREPARED: 07/01/2015 703.13J 5/13/2015

SHEET NO. 1 OF 3

PLAN OF LAYOUT DIMENSIONS (a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

© ROADWAY OR © MEDIAN→

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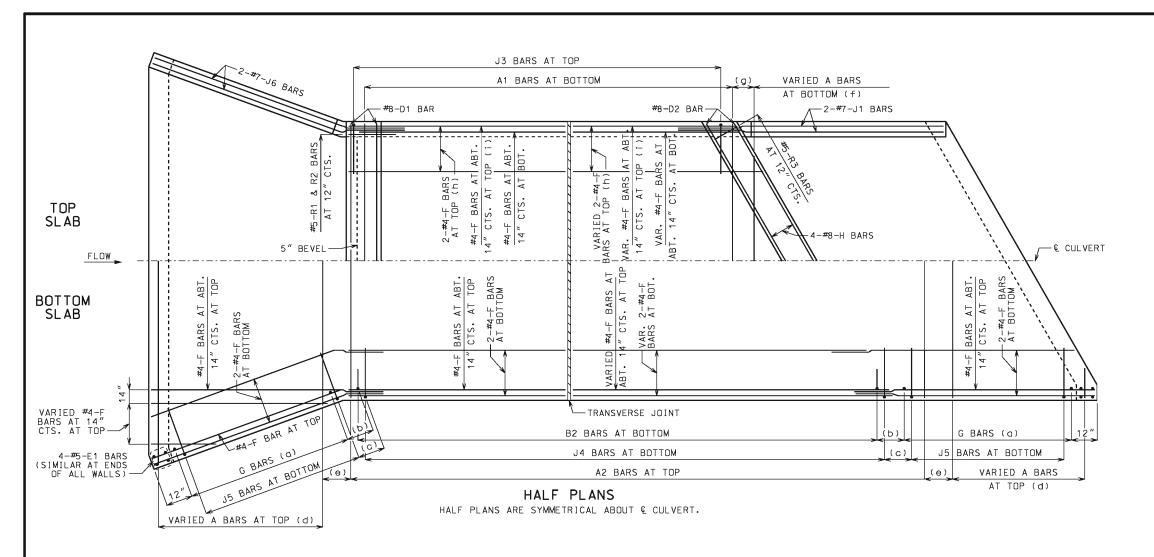
₩ = TOTAL LENGTH NORMAL TO € ROADWAY OR € MEDIAN

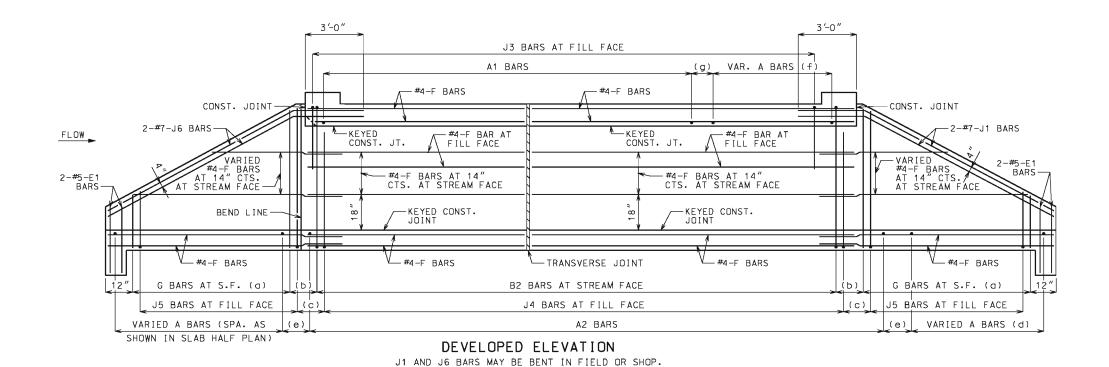
-- GRANULAR BACKEILL LIMITS

FLOW

GRANULAR BACKFILL LIMITS-

€ CUL VERT





# LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE

TO AVDID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS. SEE 703.16.

### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ .

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

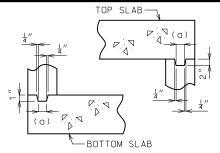
SKEW: LEFT ADVANCE WINGS: FLARED

REINFORCEMENT

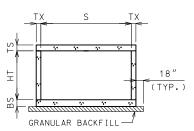
DATE EFFECTIVE: DATE PREPARED: 07/01/2015 5/13/2015

703.13J

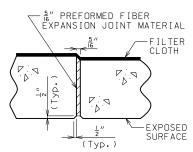
SHEET NO. 2 OF 3



KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



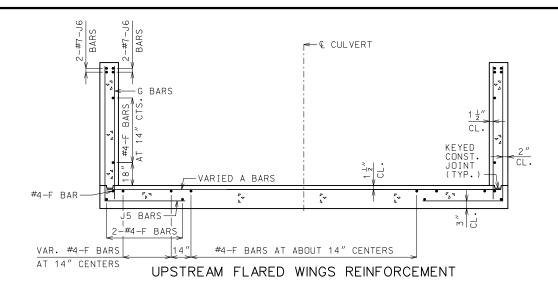
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

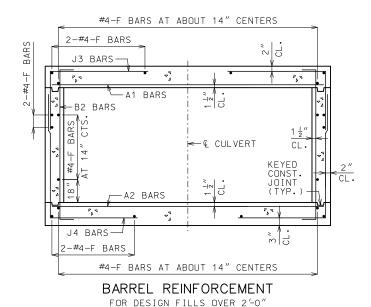


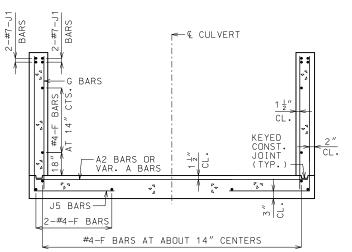
# TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

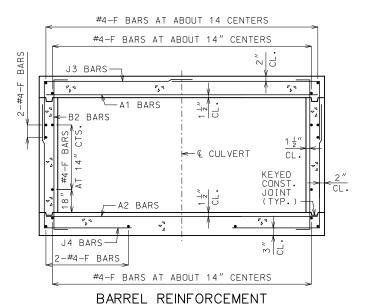
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE, FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.







DOWNSTREAM WINGS REINFORCEMENT



FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

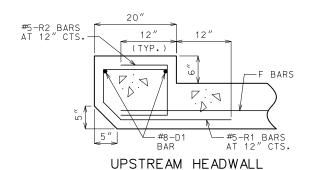
SKEW: LEFT ADVANCE WINGS: FLARED

SECTIONS

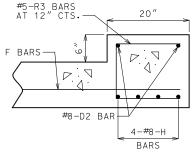
DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

703.13J

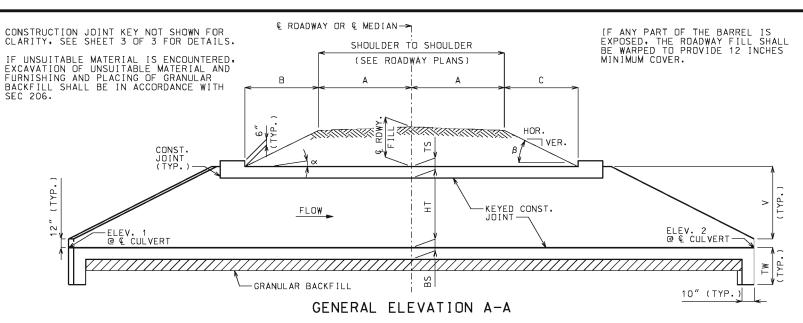
SHEET NO. 3 OF 3



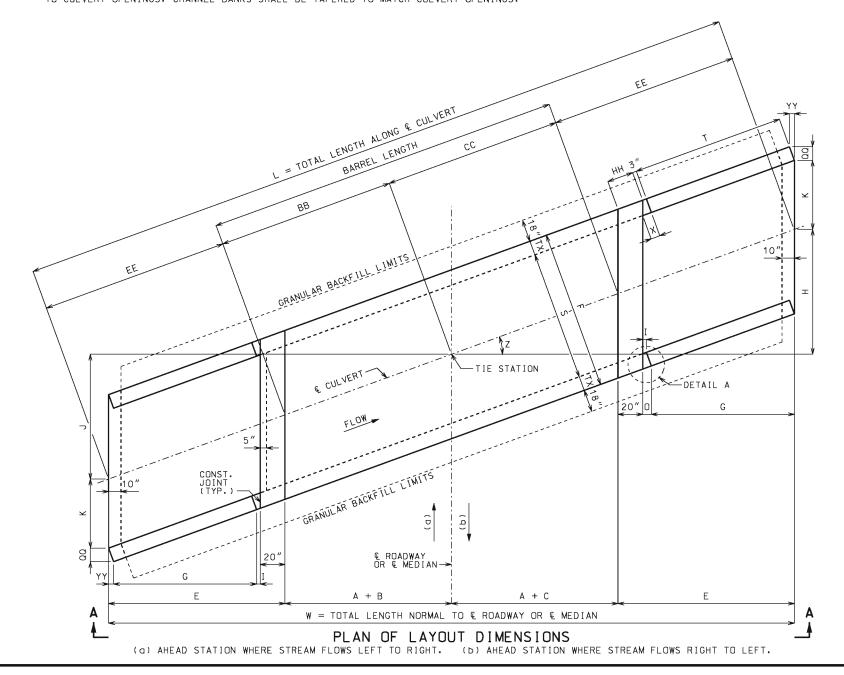
REINFORCEMENT



DOWNSTREAM HEADWALL REINFORCEMENT



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



## EQUATIONS FOR COMPUTING ∞. B. B AND C

- ∝ = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO € ROADWAY OR € MEDIAN = ARCTAN ( ELEV. 1 ELEV. 2 `
- $\beta = \text{ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO } \mathbb{C} \text{ ROADWAY DR } \mathbb{C} \text{ MEDIAN } = \text{ARCTAN}\left(\frac{\text{Ver.}}{\text{HOR.}}\right)$
- B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = € RDWY. FILL + A(CS) A(TAN∞) UPSTREAM HEADWALL NORMAL TO € ROADWAY OR € MEDIAN TAN€ + TAN∞
- C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO =  $\frac{\mathbb{C}}{\mathbb{C}}$  RDWY. FILL + A(CS) + A(TAN $\propto$ ) DOWNSTREAM HEADWALL NORMAL TO  $\mathbb{C}$  ROADWAY OR  $\mathbb{C}$  MEDIAN TAN $\beta$  TAN $\alpha$ DOWNSTREAM HEADWALL NORMAL TO & ROADWAY OR & MEDIAN
- CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM & ROADWAY OR & MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN & ROADWAY OR & MEDIAN AND THE TOP OF THE FILL SLOPE Normal to & roadway or & median. This term shall be adjusted for unsymmetrical and nonstandard roadways.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE & ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

	LAYOUT DI	MENSI	ONS
VARIABLE	DIMENSION	VARIABLE	DIMENSION
ox	SEE EQUATIONS	Т	G(SEC Z)
β	SEE EQUATIONS	٧	HT + TS - 12"
В	SEE EQUATIONS	₩	2A + B + C + 2E
С	SEE EQUATIONS	Х	3" + TX(TAN Z)
E	G + O + 20"	Z	SKEW ANGLE
F	S + 2TX	BB	(A + B)(SEC Z)
G	2V	СС	(A + C)(SEC Z)
Н	(A + C + E)(TAN Z)	EE	E(SEC Z)
I	3"(COS Z)	НН	20"(SEC Z)
J	(A + B + E)(TAN Z)	QQ	TX(COS Z)
K	S(SEC Z)/2	YY	TX(SIN Z)
L	2EE + BB + CC	Τ₩	MAX{3'-4" OR (BS + 12")}
0	I + YY		

# **GENERAL NOTES:**

### DESIGN SPECIFICATIONS:

2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EOUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

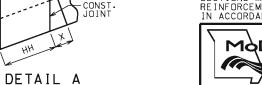
### MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



# MODOT

# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: STRAIGHT

LAYOUT

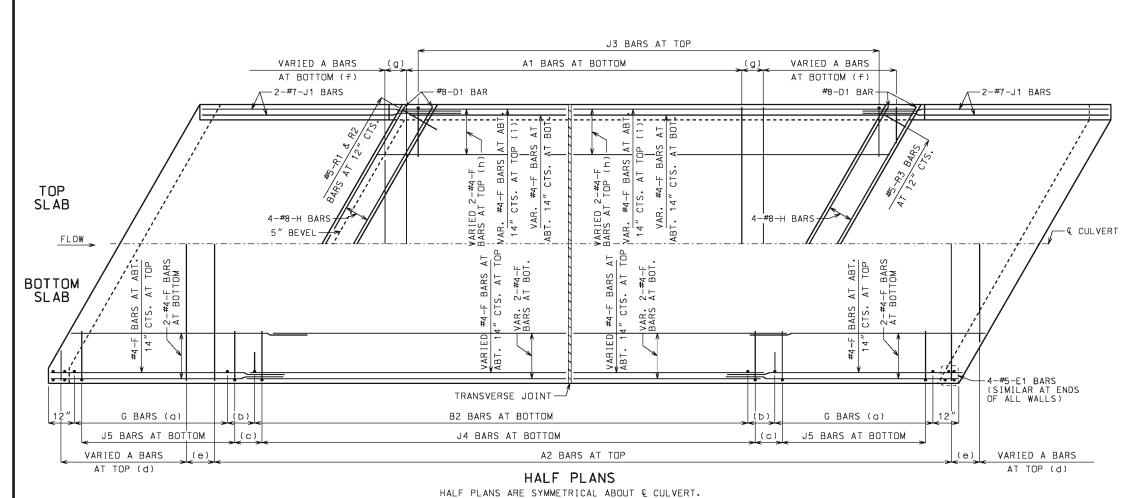
07/01/2015 5/13/2015

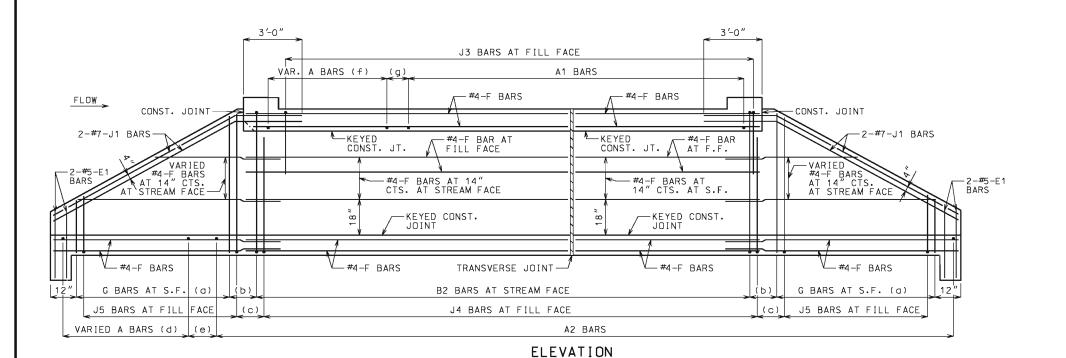
SHEET NO.

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: DATE PREPARED: 703.14J

1 OF 3





J1 BARS MAY BE BENT IN FIELD OR SHOP.

# LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

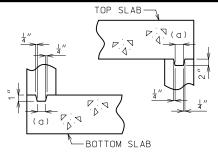
SKEW: RIGHT ADVANCE WINGS: STRAIGHT

REINFORCEMENT

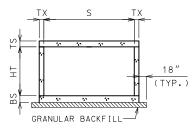
DATE EFFECTIVE: DATE PREPARED: 07/01/2015 5/13/2015 **70** 

703.14J

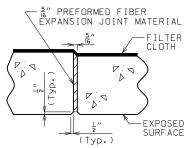
SHEET NO.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE—THIRD OF WALL THICKNESS



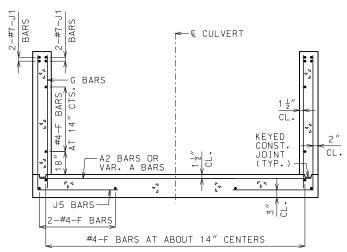
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



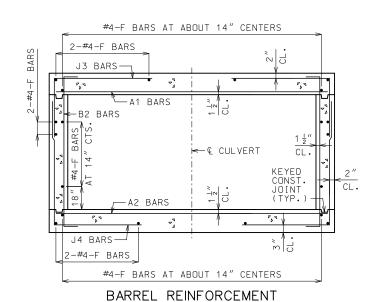
# TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

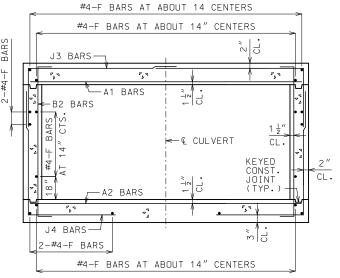
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



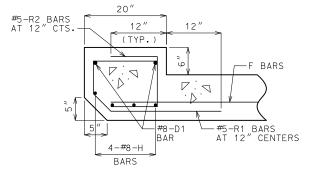
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



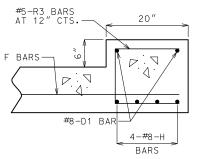
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT



DOWNSTREAM HEADWALL REINFORCEMENT

# GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT, HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

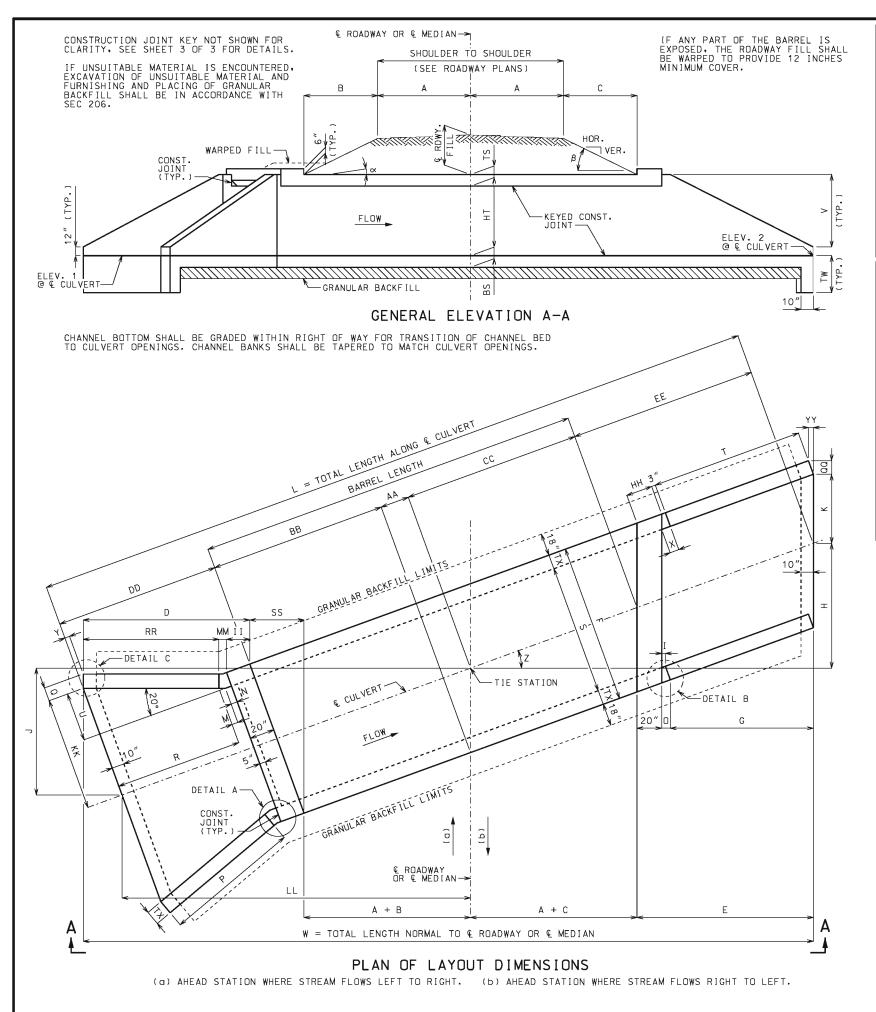
SKEW: RIGHT ADVANCE WINGS: STRAIGHT

SECTIONS

DATE EFFECTIVE: 01/01/2021 TO/14/2020 70

703.14J

J | SHEET NO. 3 OF 3



# EQUATIONS FOR COMPUTING $\propto$ , $\beta$ , B AND C

- $\alpha$  = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO & ROADWAY OR & MEDIAN = ARCTAN (ELEV. 1 ELEV. 2)
- β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO € ROADWAY OR € MEDIAN = ARCTAN (VER.)
- B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = € RDWY. FILL + A(CS) A(TAN∞) UPSTREAM HEADWALL NORMAL TO € ROADWAY OR € MEDIAN TAN€ + TAN∞
- C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO = & RDWY. FILL +
  TANS -DOWNSTREAM HEADWALL NORMAL TO & ROADWAY OR & MEDIAN
- CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM & ROADWAY OR & MEDIAN.

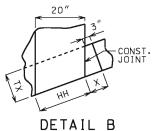
THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN & ROADWAY OR & MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO & ROADWAY OR & MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS. TO ACCOUNT FOR A VARYING PROFILE GRADE THE & ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

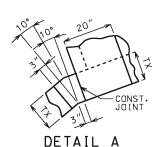
SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

		LAY	OUT DIMENSIONS		
VARIABLE	DIMENSION	VARIABLE	DIMENSION	VARIABLE	DIMENSION
ox	SEE EQUATIONS	N	3" + TX(TAN 10")	СС	(A + C)(SEC Z)
β	SEE EQUATIONS	0	I + YY	DD	R + M + N + 20"
В	SEE EQUATIONS	Р	2V[SEC(Z + 20°)]	EE	E(SEC Z)
С	SEE EQUATIONS	Q	TX(COS 20°)	НН	20"(SEC Z)
D	Z ≥ 20°: II + MM + RR	R	P(COS 20°)	ΙΙ	20"(COS Z)
U	Z < 20°: II + MM + RR + TT	Т	G(SEC Z)	KK	S/2 + U
E	G + O + 20"	U	(R + M)(TAN 20°)	LL	(AA + BB + DD)(COS Z)
F	S + 2TX	٧	HT + TS - 12"	ММ	3"[COS Z + COS(Z - 20°)]
G	2V	W	2A + B + C + D + E + SS	aa	TX(COS Z)
Н	(A + C + E)(TAN Z)	Х	3" + TX(TAN Z)	RR	P[COS (Z - 20°)]
I	3"(COS Z)	Y	TX(SIN 20°)	SS	F(SIN Z)
J	(AA + BB + DD)(SIN Z)	Z	SKEW ANGLE	TT	TX[SIN(20°- Z)]
K	S(SEC Z)/2	AA	F(TAN Z)/2	YY	TX(SIN Z)
L	AA + BB + CC + DD + EE	ВВ	(A + B)(SEC Z)	TW	MAX{3'-4" DR (BS + 12")}
М	N(COS 20°)		CENEDAL NOTEC:		

# RR DETAIL C

For Z < 20°





# **GENERAL NOTES:**

### DESIGN SPECIFICATIONS:

2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD. EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.). 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

### MISCELLANEOUS:

FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# **CONCRETE** SINGLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: FLARED

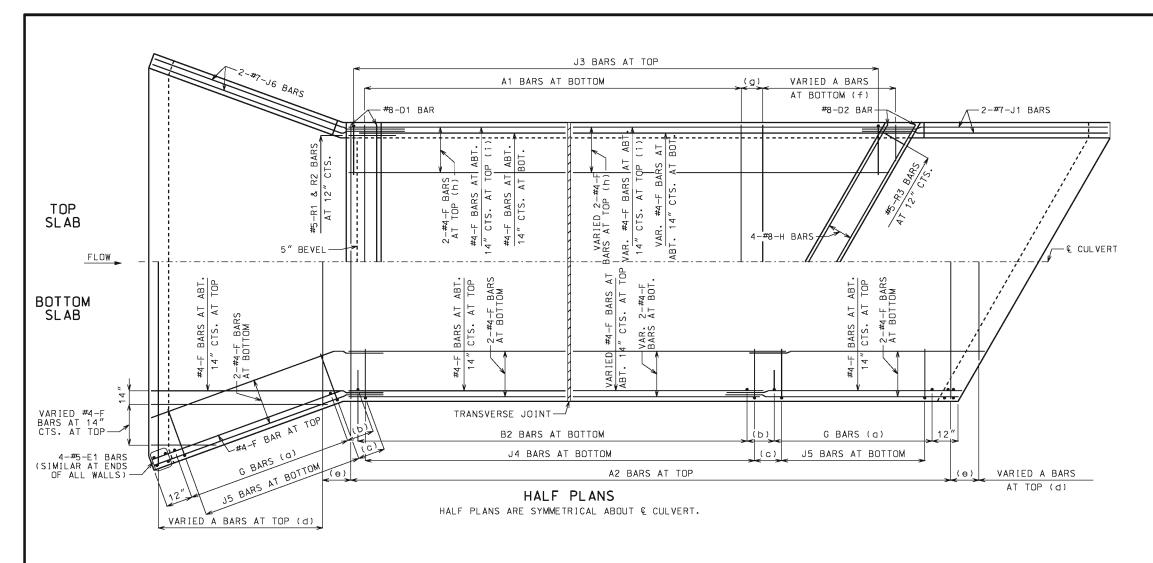
LAYOUT

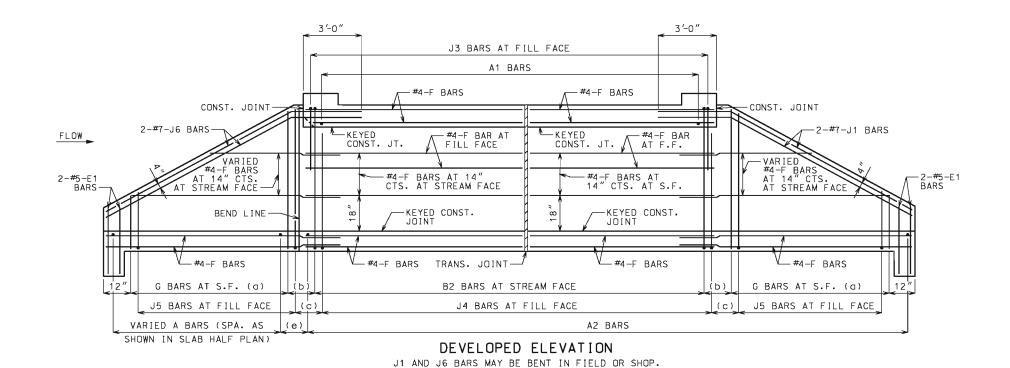
DATE EFFECTIVE: DATE PREPARED:

07/01/2015 6/4/2015

703.15E

SHEET NO. 1 OF 3





# LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

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CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

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MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS B2 BARS
- (b) VARIES. 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
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- (i) FOR DESIGN FILLS 2'-0" OR LESS



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

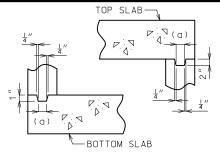
SKEW: RIGHT ADVANCE WINGS: FLARED

REINFORCEMENT

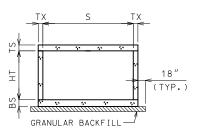
DATE EFFECTIVE: DATE PREPARED:

07/01/2015 5/13/2015 703.15E

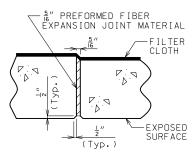
2 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



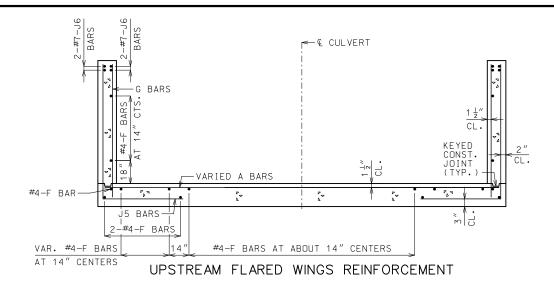
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

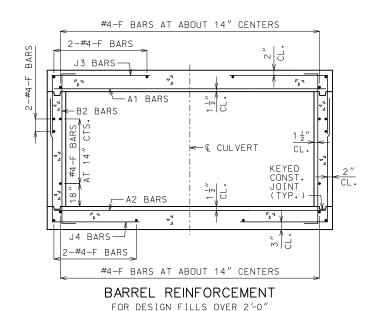


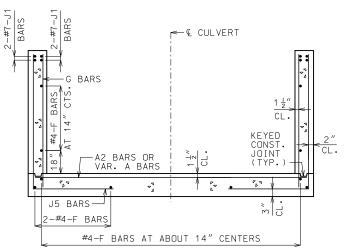
# TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

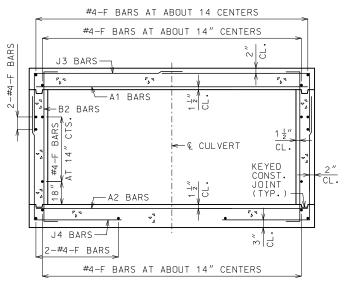
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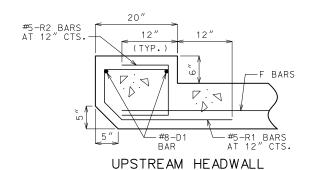




DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



REINFORCEMENT

F BARS

#8-D2 BAR

#8-D2 BAR

DOWNSTREAM HEADWALL

REINFORCEMENT

#5-R3 BARS

# GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT, HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT

CONCRETE

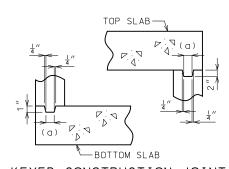
SKEW: RIGHT ADVANCE WINGS: FLARED

SECTIONS

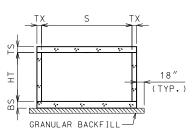
DATE EFFECTIVE: 01/01/2021
DATE PREPARED: 10/14/2020

703.15E

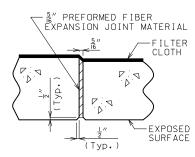
3 OF 3



KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



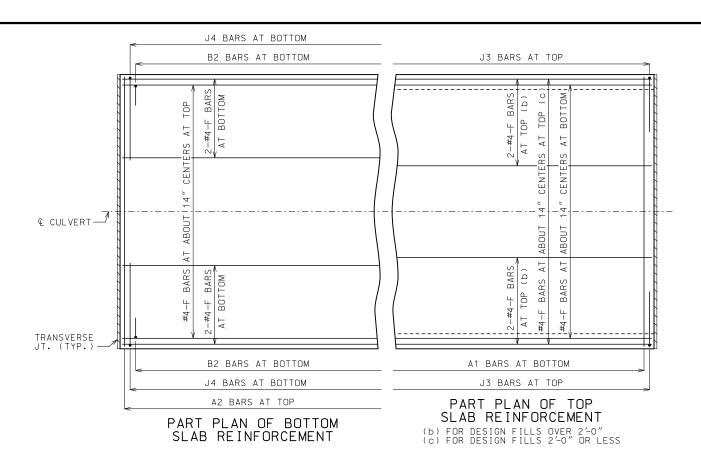
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

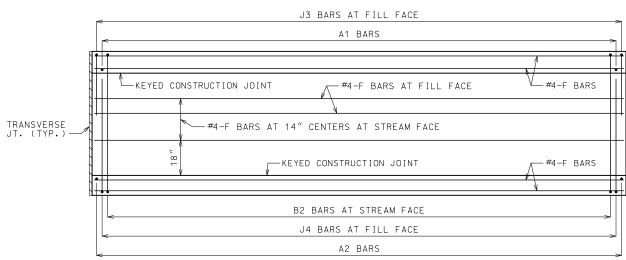


# TRANSVERSE JOINT THRU BARREL

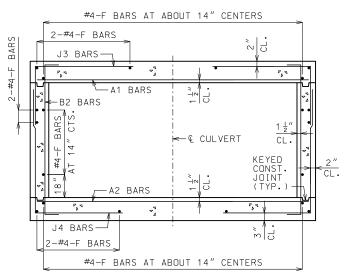
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FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY
THE CONTRACT UNIT PRICE FOR OTHER



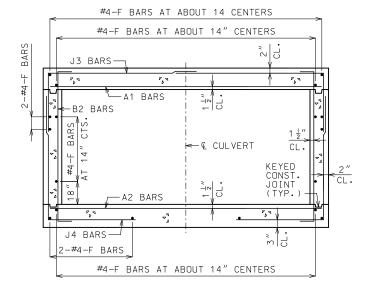


ELEVATION OF WALL REINFORCEMENT



# BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO & CULVERT.



### BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS SYMMETRICAL ABOUT AND NORMAL TO & CULVERT.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

OF MISSO DENNIS W. HECKMAN NUMBER PE-27141 PE-Z/A

# CONCRETE SINGLE BOX CULVERT

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CUT SECTION

DATE EFFECTIVE:

01/01/2021 DATE PREPARED:

703.16

SHEET NO. 1 OF 1

# GENERAL NOTES

DESIGN SPECIFICATIONS: 2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.17.

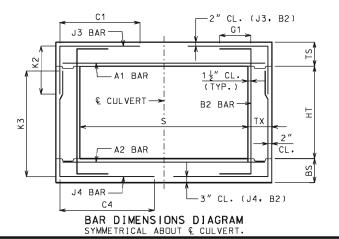
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS AND ELEVATION.

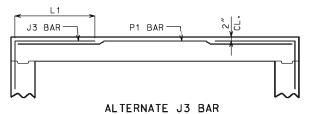
DRAWING NOT TO SCALE, FOLLOW DIMENSIONS,

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2

				SF	PAN	(S)	= 3	FT		HE	I GH 1	[ (H	Γ) =	= 2 F	T OR	3 FT				
	М	EMBE	R			Τ(	OP SLA	AB BARS	S				ВОТ	TOM SI	AB BAF	RS		WAL	L BAI	₹S
DESIGN		CKNE		Α1	BARS			J3 BA	RS		A2	BARS			J4 BAF	₹S		B:	2 BAR	s
FILL									K	2						К	.3			
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=2'	HT=3'	SIZE	SPA.	SIZE	SPA.	C4	HT=2'	HT=3'	SIZE	SPA.	G1
1 FT	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	32.5	28	40	5	12	12
2 FT	9	8	8	4	7	4	12	32.5	25.3	33.6	4	11.5	4	12	30.8	28	40	5	12	12
4 FT	8	8	8	4	12	4	12	26.4	24.1	32.4	4	12	4	12	26.0	28	40	5	12	0
6 FT	8	8	8	4	12	4	12	24.6	24.1	32.4	4	12	4	12	24.6	28	40	5	12	0
8 FT	8	8	8	4	12	4	12	23.8	24.1	32.4	4	12	4	12	23.8	28	40	5	12	0
10 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
12 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
14 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
16 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
18 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	12	4	12	22.0	28	40	5	12	0
20 FT	8	8	8	4	12	4	12	22.0	24.1	32.4	4	11	4	12	22.0	28	40	5	12	0
22 FT	8	8	8	4	11.5	4	12	22.0	24.1	32.4	4	10	4	12	22.0	28	40	5	12	0
24 FT	8	8	8	4	10.5	4	12	22.0	24.1	32.4	4	9	4	12	22.0	28	40	5	12	0
26 FT	8	8	8	4	9.5	4	12	22.0	24.1	32.4	4	8.5	4	11.5	22.0	28	40	5	12	0
28 FT	8	8	8	4	9	4	11.5	22.0	24.1	32.4	4	8	4	10.5	22.0	28	40	5	12	0
30 FT	8	8	8	4	8.5	4	11	22.0	24.1	32.4	4	7.5	4	10	22.0	28	40	5	12	0
32 FT	8	8	8	4	8	4	10	22.0	24.1	32.4	4	7	4	9.5	22.0	28	40	5	12	0
34 FT	8	8	8	4	7.5	4	9.5	22.0	24.1	32.4	4	6.5	4	8.5	22.0	28	40	5	12	0
36 FT	8	8	8	4	7	4	9	22.0	24.1	32.4	4	6	4	8	22.0	28	40	5	12	0
38 FT	8	8	8	4	6.5	4	8.5	22.0	24.1	32.4	5	9	4	8	22.0	28	40	5	12	0
40 FT	8	9	8	4	6.5	4	8	22.0	24.1	32.1	4	6	4	11	21.5	29	41	5	12	0
42 FT	8	9	8	4	6	4	8	22.0	24.1	32.1	5	9	4	10	21.5	29	41	5	12	0
44 FT	8	9	8	4	6	4	7.5	22.0	24.1	32.1	5	8.5	4	10	21.5	29	41	5	12	0
46 FT	8	9	8	4	6	4	7	22.0	24.1	32.1	5	8	4	9.5	21.5	29	41	5	12	0
48 FT	8	10	8	4	6	4	7	22.0	24.0	31.9	5	8.5	4	12	21.5	30	42	5	12	0
50 FT	8	10	8	4	6	4	6.5	22.0	24.0	31.9	5	8	4	12	21.5	30	42	5	12	0

				SF	AN (	(S)	= 3	FT		HE	I GH 1	(H)	Γ) =	= 4 F	T OR	5 FT				
		EMBE				T	OP SLA	AB BARS	5				BOT	TOM SI	_AB BAI	RS		₩AL	L BA	RS
DESIGN	TH:	ICKN	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BA	RS		B2	2 BAR	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	2 HT=5'	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	3 HT=5′	SIZE	SPA.	G1
1 FT	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10.5	4	12	32.5	52	64	5	12	12
2 FT	9	8	8	4	6.5	4	12	32.5	25.3	30.3	4	10	4	12	32.5	52	64	5	12	12
4 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
6 FT	8	8	8	4	12	4	12	36.1	24.3	29.1	4	12	4	12	33.5	52	64	5	12	0
8 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
10 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
12 FT	8	8	8	4	12	4	12	35.6	24.3	29.1	4	12	4	12	32.5	52	64	5	12	0
14 FT	8	8	8	4	12	4	12	34.4	24.3	29.1	4	12	4	11.5	36.1	52	64	5	12	0
16 FT	8	8	8	4	12	4	12	33.5	24.3	29.1	4	12	4	11	35.3	52	64	5	12	0
18 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	12	4	10.5	34.8	52	64	5	12	0
20 FT	8	8	8	4	12	4	12	31.6	24.3	29.1	4	10.5	4	10	34.4	52	64	5	12	0
22 FT	8	8	8	4	11.5	4	11	31.6	24.3	29.1	4	9.5	4	9.5	33.9	52	64	5	12	0
24 FT	8	8	8	4	10.5	4	10	31.6	24.3	29.1	4	9	4	9	33.9	52	64	5	12	0
26 FT	8	8	8	4	9.5	4	9.5	31.3	24.3	29.1	4	8.5	4	8	33.5	52	64	5	12	0
28 FT	8	8	8	4	9	4	8.5	31.3	24.3	29.1	4	7.5	4	7.5	33.0	52	64	5	12	0
30 FT	8	8	8	4	8.5	4	8	31.3	24.3	29.1	4	7	4	7	33.0	52	64	5	12	0
32 FT	8	8	8	4	8	4	7.5	30.8	24.3	29.1	4	7	4	6.5	33.0	52	64	5	12	0
34 FT	8	8	8	4	7.5	4	7	30.8	24.3	29.1	4	6.5	4	6.5	32.5	52	64	5	12	0
36 FT	8	8	8	4	7	4	7	30.8	24.3	29.1	4	6	4	6	32.5	52	64	5	12	0
38 FT	8	8	8	4	6.5	4	6.5	30.8	24.3	29.1	5	9	5	7	32.5	52	64	5	12	0
40 FT	8	9	8	4	6.5	4	6	30.8	24.0	28.8	4	6	4	6.5	32.5	53	65	5	12	0
42 FT	8	9	8	4	6	4	6	30.8	24.0	28.8	5	9	4	6	32.5	53	65	5	11.5	0
44 FT	8	9	8	4	6	5	6.5	30.8	24.0	28.8	5	8.5	4	6	32.5	53	65	5	11	0
46 FT	8	9	8	4	6	5	6.5	30.4	24.0	28.8	5	8	5	6.5	34.8	53	65	5	10.5	0
48 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	5	8	5	6.5	34.8	53	65	5	10	0
50 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	5	7.5	5	6	34.8	53	65	5	9.5	0





ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 3 FEET HE[GHT (HT): 2 THRU 5 FEET

DATE EFFECTIVE: DATE PREPARED:

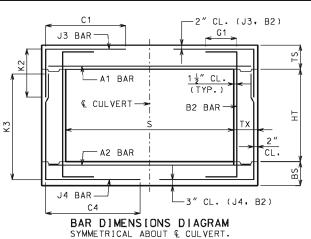
04/01/2011 4/18/2011

703.17

SHEET NO. 1 OF 14

				SF	PAN	(S)	= 4	FT		HE	I GH 1	(H)	Γ) =	2 F	T OR	3 FT				
		EMBE				Τ(	OP SLA	AB BAR	5				вот	TOM SL	AB BAF	₹S		WAL	_L BA	RS
DESIGN	TH:	CKNE	ESS	A1	BARS			J3 BA			A2	BARS			J4 BAI			B	2 BAR	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=2'	2 HT=3'	SIZE	SPA.	SIZE	SPA.	C4	HT=2'	3 HT=3′	SIZE	SPA.	G1
1 FT	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	30.3	28	40	5	12	12
2 FT	10	8	8	4	6	4	10.5	38.6	26.3	34.8	4	7	4	7	28.0	28	40	5	12	12
4 FT	8	8	8	4	12	4	12	25.3	24.1	32.4	4	11	4	12	25.3	28	40	5	12	0
6 FT	8	8	8	4	12	4	12	24.6	24.1	32.4	4	12	4	12	24.6	28	40	5	12	0
8 FT	8	8	8	4	12	4	12	24.1	24.1	32.4	4	12	4	12	24.1	28	40	5	12	0
10 FT	8	8	8	4	12	4	12	23.0	24.1	32.4	4	12	4	12	23.0	28	40	5	12	0
12 FT	8	8	8	4	12	4	12	23.0	24.1	32.4	4	11	4	12	23.0	28	40	5	12	0
14 FT	8	8	8	4	11	4	12	23.0	24.1	32.4	4	9.5	4	11.5	23.0	28	40	5	12	0
16 FT	8	8	8	4	10	4	11	23.0	24.1	32.4	4	8.5	4	10	23.0	28	40	5	12	0
18 FT	8	8	8	4	8.5	4	10	23.0	24.1	32.4	4	7.5	4	9	22.4	28	40	5	12	0
20 FT	8	8	8	4	8	4	9	23.0	24.1	32.4	4	6.5	4	8	22.4	28	40	5	12	0
22 FT	8	8	8	4	7	4	8	23.0	24.1	32.4	4	6	4	7.5	22.4	28	40	5	12	0
24 FT	8	8	8	4	6.5	4	7.5	23.0	24.1	32.4	5	8.5	4	6.5	22.4	28	40	5	12	0
26 FT	8	8	8	4	6	4	7	23.0	24.1	32.4	5	8	4	6	22.4	28	40	5	12	0
28 FT	8	9	8	4	6	4	6.5	23.0	24.1	32.1	5	8	4	8	21.9	29	41	5	12	0
30 FT	8	g	8	4	6	4	6	23.0	24.1	32.1	5	7.5	4	7.5	21.9	29	41	5	12	0
32 FT	8	10	8	4	6	5	6.5	23.0	24.0	31.9	5	7.5	4	10	21.3	30	42	5	12	0
34 FT	9	10	8	5	8.5	4	7	22.4	25.1	33.0	5	7.5	4	9.5	21.3	30	42	5	12	0
36 FT	9	10	8	5	8.5	4	7	22.4	25.1	33.0	5	7	4	9	21.3	30	42	5	12	0
38 FT	9	11	8	5	8.5	4	6.5	22.4	25.4	33.1	5	7	4	10	20.8	31	43	5	12	0
40 FT	9	11	8	5	8.5	4	6	22.4	25.4	33.1	5	6.5	4	9.5	20.8	31	43	5	12	0
42 FT	10	11	8	5	8	4	7	21.9	26.0	33.8	5	6.5	4	9	21.3	31	43	5	12	0
44 FT	10	11	8	5	8	4	6.5	21.9	26.0	33.8	5	6.5	4	8.5	21.3	31	43	5	12	0
46 FT	10	12	8	5	8	4	6.5	21.9	26.3	33.9	5	6	4	9.5	20.8	32	44	5	12	0
48 FT	10	12	8	5	8	4	6	21.9	26.3	33.9	5	6	4	9.5	20.8	32	44	5	12	0
50 FT	11	12	8	5	7.5	4	7	21.3	27.3	35.1	5	6	4	9.5	21.3	32	44	5	12	0

				SF	PAN	(S)	= 4	FT		HE	IGHT	[ (H]	Γ) =	: 6 F	T OR	7 FT				
		EMBE				ΤC	OP SLA	B BARS	5				BOT	TOM SI	_AB BAF	₹S		₩Al	L BAF	₹S
DESIGN	THI	CKNE	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BAF	₹S		B2	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	S I ZE	SPA.	C1	K HT=6'	2 HT=7'	S I ZE	SPA.	SIZE	SPA.	C4	K HT=6'	3 HT=7'	SIZE	SPA.	G1
1 FT	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	9	4	7	38.6	76	88	5	12	12
2 FT	10	8	8	5	8.5	4	10.5	38.6	26.4	30.1	5	8.5	4	6.5	38.6	76	88	5	12	12
4 FT	8	8	8	4	11	4	11	38.6	24.1	27.5	4	9	4	8	38.6	76	88	5	12	0
6 FT	8	8	8	4	12	4	11	38.6	24.1	27.5	4	10.5	4	7	38.6	76	88	5	12	0
8 FT	8	8	8	4	12	4	10	38.6	24.1	27.5	4	10.5	4	7	38.6	76	88	5	12	0
10 FT	8	8	8	4	12	4	11	38.6	24.1	27.5	4	11	4	7	38.6	76	88	5	12	0
12 FT	8	8	8	4	12	4	9.5	38.6	24.1	27.5	4	10	4	6.5	38.6	76	88	5	12	0
14 FT	8	8	8	4	10.5	4	8	38.6	24.1	27.5	4	8.5	4	6	38.6	76	88	5	12	0
16 FT	8	9	8	4	9.5	4	7	38.6	24.4	27.9	4	8.5	4	6.5	38.6	77	89	5	12	0
18 FT	8	9	8	4	8.5	4	6.5	38.6	24.4	27.9	4	7.5	4	6	38.6	77	89	5	12	0
20 FT	8	10	8	4	8	4	6	38.6	24.6	28.1	4	7.5	4	6	40.9	78	90	5	11.5	0
22 FT	8	10	9	4	7.5	4	6.5	40.5	24.6	28.1	4	7	4	7	39.9	78	90	5	11.5	0
24 FT	8	10	9	4	7	4	6	39.9	24.6	28.1	4	6.5	4	6.5	39.9	78	90	5	11	0
26 FT	8	10	9	4	6.5	5	6.5	39.4	24.6	28.1	4	6	4	6	39.9	78	90	5	10	0
28 FT	8	10	9	4	6	5	6	38.8	24.6	28.1	5	9	5	7	41.6	78	90	5	9.5	0
30 FT	8	10	9	4	6	6	7.5	41.0	24.6	28.1	5	8.5	5	6.5	41.6	78	90	5	9	0
32 FT	8	10	9	4	6	6	7	40.5	24.6	28.1	5	8	5	6	41.6	78	90	5	8.5	0
34 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	8.5	5	6	41.6	79	91	5	8.5	0
36 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	8	5	6	41.6	79	91	5	8.5	0
38 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	7.5	6	7	43.9	79	91	5	8.5	0
40 FT	9	11	9	5	8.5	5	6	41.6	26.1	29.8	5	7	6	7	43.9	79	91	5	8.5	0
42 FT	10	11	9	5	8	5	6	41.6	30.8	35.0	5	7	6	6.5	43.9	79	91	5	8.5	0
44 FT	10	11	9	5	8	5	6	41.6	30.8	35.0	5	6.5	6	6.5	43.9	79	91	5	8.5	0
46 FT	10	11	10	5	8	5	6.5	42.9	26.4	30.0	5	6.5	5	6	42.9	79	91	5	8	0
48 FT	10	11	10	5	8	5	6.5	42.9	30.8	35.0	5	6	6	7.5	44.6	79	91	5	8	0
50 FT	11	12	11	5	7.5	5	7	44.3	27.9	31.6	5	6.5	5	7.5	43.6	80	92	5	7.5	0



				SF	PAN	(S)	= 4	FT		HE	I GH1	( H	Γ) =	: 4 F	T OR	5 FT				
		EMBE				Τ(	OP SLA	AB BARS	5				BOT:	TOM SI	_AB BAF	₹S		WAL	L BAF	₹S
DESIGN	TH:	CKNE	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BAI	₹S		B	2 BARS	ŝ
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	2 HT=5′	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	3 HT=5′	SIZE	SPA.	G1
1 FT	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	8	38.6	52	64	5	12	12
2 FT	10	8	8	5	9	4	10.5	38.6	26.3	31.4	4	6	4	7.5	38.6	52	64	5	12	12
4 FT	8	8	8	4	11.5	4	12	38.6	24.3	29.1	4	9.5	4	11.5	38.6	52	64	5	12	0
6 FT	8	8	8	4	12	4	12	35.9	24.3	29.1	4	11	4	11.5	35.3	52	64	5	12	0
8 FT	8	8	8	4	12	4	12	32.5	24.3	29.1	4	11	4	11	32.5	52	64	5	12	0
10 FT	8	8	8	4	12	4	12	28.0	24.3	29.1	4	11.5	4	11.5	28.0	52	64	5	12	0
12 FT	8	8	8	4	12	4	12	27.5	24.3	29.1	4	10	4	10.5	28.0	52	64	5	12	0
14 FT	8	8	8	4	10.5	4	12	27.5	24.3	29.1	4	9	4	10	27.5	52	64	5	12	0
16 FT	8	8	8	4	9.5	4	11	26.9	24.3	29.1	4	8	4	9.5	27.5	52	64	5	12	0
18 FT	8	8	8	4	8.5	4	9.5	26.9	24.3	29.1	4	7	4	8.5	27.5	52	64	5	12	0
20 FT	8	8	8	4	7.5	4	9	26.9	24.3	29.1	4	6.5	4	7.5	27.5	52	64	5	12	0
22 FT	8	8	8	4	7	4	8	26.9	24.3	29.1	4	6	4	7	27.5	52	64	5	12	0
24 FT	8	8	8	4	6	4	7.5	26.9	24.3	29.1	5	8.5	4	6.5	26.9	52	64	5	12	0
26 FT	8	8	8	4	6	4	6.5	26.9	24.3	29.1	5	8	4	6	26.9	52	64	5	12	0
28 FT	8	9	8	4	6	4	6	26.9	24.0	28.8	5	8	4	7.5	27.5	53	65	5	12	0
30 FT	8	9	8	4	6	4	6	26.9	24.0	28.8	5	7.5	4	7	27.5	53	65	5	12	0
32 FT	8	9	8	4	6	5	6.5	26.9	24.0	28.8	5	7.5	4	6.5	27.5	53	65	5	12	0
34 FT	9	10	8	5	8.5	4	6.5	26.9	25.4	30.4	5	7	4	7.5	28.0	54	66	5	12	0
36 FT	9	10	8	5	8.5	4	6	26.9	25.4	30.4	5	7	4	7	28.0	54	66	5	12	0
38 FT	9	10	8	5	8.5	5	7	26.9	25.4	30.4	5	7	4	7	28.0	54	66	5	12	0
40 FT	9	11	8	5	8.5	5	6.5	26.9	25.3	30.0	5	6.5	4	7	28.5	55	67	5	12	0
42 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6.5	28.5	55	67	5	12	0
44 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6	28.5	55	67	5	12	0
46 FT	10	11	8	5	8	5	7.5	27.5	26.3	31.1	5	6.5	4	6	28.5	55	67	5	12	0
48 FT	10	12	8	5	8	5	7.5	27.5	26.0	30.8	5	6	4	6	29.1	56	68	5	11.5	0

50 FT 11 12 8 5 7.5 5 8 28.0 27.0 32.0 5 6 4 6 29.1 56 68 5 11 0

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

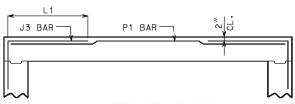
SPAN (S): 4 FEET HE[GHT (HT): 2 THRU 7 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

SHEET NO. 2 OF 14



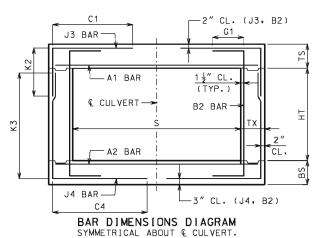
# ALTERNATE J3 BAR

ALTERNATE JS BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUIAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

				SF	PAN	(S)	= 5	FT		HE	I GH 1	L (H.	Γ) =	= 3 F	T OR	4 FT				
	М	EMBE	R			Τt	OP SLA	AB BARS	5				ВОТ	TOM SI	AB BAI	₹S		WAL	_L BA	₹S
DESIGN	TH:	ICKNE	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BAI	₹\$		B	2 BAR	S
FILL	TS	BS	ТХ	SIZE	SPA.	S I ZE	SPA.	C1	HT=3'	2 HT=4'	SIZE	SPA.	SIZE	SPA.	C4	HT=3'	3 HT=4'	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8.5	4	6	35.4	40	52	5	12	12
2 FT	10	8	8	5	8	4	10.5	44.9	26.5	33.0	5	8	4	6	32.0	40	52	5	12	12
4 FT	8	8	8	4	8.5	4	10.5	28.5	24.5	30.6	4	7.5	4	10	28.5	40	52	5	12	0
6 FT	8	8	8	4	10	4	12	27.3	24.5	30.6	4	8	4	10	27.3	40	52	5	12	0
8 FT	8	8	8	4	9.5	4	11	26.5	24.5	30.6	4	8	4	9.5	26.5	40	52	5	12	0
10 FT	8	8	8	4	10	4	12	25.1	24.5	30.6	4	8.5	4	10.5	25.1	40	52	5	12	0
12 FT	8	8	8	4	8.5	4	10	25.1	24.5	30.6	4	7	4	9	25.1	40	52	5	12	0
14 FT	8	8	8	4	7.5	4	8.5	25.1	24.5	30.6	4	6	4	7.5	25.1	40	52	5	12	0
16 FT	8	8	8	4	6.5	4	7.5	25.1	24.5	30.6	5	8.5	4	7	25.1	40	52	5	12	0
18 FT	8	8	8	4	6	4	6.5	25.1	24.5	30.6	5	8	4	6	25.1	40	52	5	12	0
20 FT	8	8	8	4	6	4	6	25.1	24.5	30.6	5	8	5	6.5	25.1	40	52	5	12	0
22 FT	8	9	8	4	6	5	6.5	25.1	24.0	30.0	5	7.5	4	7	23.8	41	53	5	12	0
24 FT	8	9	8	4	6	5	6	25.1	24.0	30.0	5	7.5	4	6.5	23.8	41	53	5	12	0
26 FT	9	10	8	5	8.5	4	6.5	24.5	25.0	31.0	5	7	4	8.5	23.8	42	54	5	12	0
28 FT	9	10	8	5	8.5	4	6	24.5	25.0	31.0	5	7	4	8	23.8	42	54	5	12	0
30 FT	9	11	8	5	8	5	6.5	24.5	25.5	31.5	5	6.5	4	9	23.1	43	55	5	12	0
32 FT	10	11	8	5	8	4	6	23.8	26.0	32.0	5	6.5	4	8	23.1	43	55	5	12	0
34 FT	10	12	8	5	7.5	5	7.5	23.8	26.5	32.5	5	6	4	9	22.5	44	56	5	12	0
36 FT	10	12	8	5	7	5	7.5	23.8	26.5	32.5	5	6	4	8.5	22.5	44	56	5	12	0
38 FT	11	12	8	5	7	4	6	23.8	27.0	33.0	5	6	4	8	23.1	44	56	5	12	0
40 FT	11	13	8	5	6.5	5	8.5	23.8	27.5	33.5	5	6	4	8.5	22.5	45	57	5	12	0
42 FT	12	13	8	5	6.5	4	6	23.1	28.0	34.0	5	6	4	8	23.1	45	57	5	12	0
44 FT	12	13	8	5	6.5	5	9	23.1	28.0	34.0	5	6	4	7.5	23.1	45	57	5	12	0
46 FT	12	14	8	5	6	5	8.5	23.8	28.5	34.5	6	8	4	7.5	22.5	46	58	5	12	0
48 FT	13	14	8	5	6	4	6	23.1	29.0	35.0	6	8	4	7.5	23.1	46	58	5	12	0
50 FT	13	14	8	5	6	5	8.5	23.1	29.0	35.0	6	8	4	7.5	23.1	46	58	5	12	0

				SF	PAN	(S)	= 5	FT		HE	IGHT	(H)	Γ) =	: 7 F	T OR	8 FT				
		EMBE				TC	DP SLA	AB BARS	5				BOT	TOM SI	_AB BAF	₹S		₩A	LL BAF	₹S
DESIGN	THI	CKNE	SS	A1	BARS			J3 BA	RS		A2	BARS			J4 BAI	₹S		B.	2 BARS	S
FILL	TS	BS	TX	SIZE	SPA.	S I ZE	SPA.	C1	K HT=7'	2 HT=8′	S I ZE	SPA.	SIZE	SPA.	C4		3 HT=8′	SIZE	SPA.	G1
1 FT	10	9	8	5	8	4	9.5	44.9	26.5	29.8	5	7.5	4	7	44.9	89	101	5	12	12
2 FT	10	9	8	5	8	4	8.5	44.9	26.5	29.8	5	7.5	4	6.5	44.9	89	101	5	12	12
4 FT	8	8	8	4	7.5	4	7.5	44.9	24.8	27.9	4	6.5	4	6	44.9	88	100	5	12	0
6 FT	8	9	8	4	9	4	7.5	44.9	24.0	27.0	4	7.5	4	6.5	44.9	89	101	5	12	0
8 FT	8	9	8	4	9	4	7	44.9	24.0	27.0	4	7.5	4	6	44.9	89	101	5	12	0
10 FT	8	9	8	4	10	4	7.5	44.9	24.0	27.0	4	8	4	6.5	44.9	89	101	5	12	0
12 FT	8	10	8	4	8.5	4	6.5	44.9	24.3	27.3	4	8	4	6.5	44.9	90	102	5	12	0
14 FT	8	10	9	4	7.5	4	6.5	41.4	24.3	27.3	4	7	4	7	45.5	90	102	5	12	0
16 FT	8	10	9	4	6.5	4	6	40.8	24.3	27.3	4	6	4	6.5	45.5	90	102	5	11.5	0
18 FT	8	10	9	4	6	5	6.5	40.0	24.3	27.3	5	9	4	6	45.5	90	102	5	10.5	0
20 FT	8	10	9	4	6	5	6	39.4	25.3	28.4	5	8	5	6.5	47.6	90	102	5	10	0
22 FT	8	10	9	4	6	6	7	42.1	25.3	28.4	5	7.5	5	6	47.6	90	102	5	9	0
24 FT	9	11	9	5	8.5	5	6	41.4	26.8	30.0	5	7.5	5	6	47.6	91	103	5	8.5	0
26 FT	9	11	9	5	8.5	5	6	41.4	26.8	30.0	5	7	6	7.5	49.6	91	103	5	8.5	0
28 FT	9	11	9	5	8.5	5	6	41.4	29.8	33.3	5	6.5	6	7	49.6	91	103	5	8.5	0
30 FT	9	11	9	5	8	5	6	40.8	29.8	33.3	5	6.5	6	6.5	49.6	91	103	5	8.5	0
32 FT	10	11	9	5	8	5	6	46.3	30.0	33.6	5	6.5	6	6	49.6	91	103	5	8.5	0
34 FT	10	11	9	5	7.5	5	6	45.5	30.0	33.6	5	6	6	6	49.6	91	103	5	8.5	0
36 FT	10	12	10	5	7	5	6.5	40.6	30.3	33.9	5	6	5	6	49.0	92	104	5	8	0
38 FT	11	12	10	5	7.5	5	6	43.4	31.6	35.4	5	6	6	7	51.1	92	104	5	8	0
40 FT	11	12	11	5	7.5	5	7	41.1	31.6	35.4	5	6	5	6.5	49.8	92	104	5	7.5	0
42 FT	11	13	11	5	7	5	7	41.1	31.9	35.6	5	6	5	6.5	49.8	93	105	5	7.5	0
44 FT	12	13	11	5	7	5	6.5	43.3	32.3	36.0	5	6	5	6	49.8	93	105	5	7.5	0
46 FT	12	13	11	5	7	5	6	43.3	32.3	36.0	5	6	5	6	49.8	93	105	5	7.5	0
48 FT	12	14	12	5	6.5	5	6.5	41.0	32.5	36.3	6	8	5	6.5	51.1	94	106	5	7	0
50 FT	13	14	12	5	6.5	5	6.5	43.3	33.9	37.8	6	8	5	6.5	51.1	94	106	5	7	0



				SF	PAN	(S)	= 5	FT		HE	I GH	Г (Н	Γ) =	5 F	T OR	6 FT				
		EMBE				T(	OP SLA	AB BAR	S				BOT:	TOM SI	_AB BAI	RS		₩Al	LL BAI	₹S
DESIGN	TH:	CKNE	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BA	RS		B	2 BAR	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	2 HT=6'	SIZE	SPA.	SIZE	SPA.	C4	HT=5'	3 HT=6'	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12
2 FT	10	8	8	5	8	4	10.5	44.9	26.3	30.6	5	8	4	6	44.9	64	76	5	12	12
4 FT	8	8	8	4	8	4	11	44.9	24.1	28.3	4	7	4	8.5	44.9	64	76	5	12	0
6 FT	8	8	8	4	9	4	10.5	39.5	24.1	28.3	4	7.5	4	8	38.1	64	76	5	12	0
8 FT	8	8	8	4	9	4	10	34.6	24.1	28.3	4	7	4	7.5	34.6	64	76	5	12	0
10 FT	8	8	8	4	9.5	4	11	30.6	24.1	28.3	4	8	4	8	30.6	64	76	5	12	0
12 FT	8	8	8	4	8	4	9	29.9	24.1	28.3	4	6.5	4	7.5	30.6	64	76	5	12	0
14 FT	8	8	8	4	7	4	8	29.9	24.1	28.3	4	6	4	6.5	29.9	64	76	5	12	0
16 FT	8	8	8	4	6	4	7	29.3	24.1	28.3	5	8	4	6	29.9	64	76	5	12	0
18 FT	8	8	8	4	6	4	6	29.3	24.1	28.3	5	8	5	6.5	29.9	64	76	5	12	0
20 FT	8	8	8	4	6	5	6.5	29.3	24.1	28.3	5	8	5	6	29.9	64	76	5	12	0
22 FT	8	9	8	4	6	5	6	29.3	24.5	28.5	5	7.5	4	6	29.9	65	77	5	12	0
24 FT	8	9	8	5	9	6	7.5	32.0	28.1	32.8	5	7.5	5	6.5	29.9	65	77	5	12	0
26 FT	9	10	8	5	8.5	5	6.5	29.3	25.1	29.3	5	7	4	6	30.6	66	78	5	12	0
28 FT	9	10	8	5	8	5	6.5	29.3	25.1	29.3	5	7	5	7	29.9	66	78	5	12	0
30 FT	9	10	8	5	7.5	5	6.5	29.3	29.6	34.4	5	6.5	5	6.5	29.9	66	78	5	12	0
32 FT	10	11	8	5	7.5	5	7	29.3	26.6	30.8	5	6.5	5	7.5	30.6	67	79	5	12	0
34 FT	10	11	8	5	7.5	5	6.5	29.3	26.6	30.8	5	6.5	5	7	30.6	67	79	5	11.5	0
36 FT	10	11	8	5	7	5	6.5	29.3	30.4	35.3	5	6	5	6	30.6	67	79	5	11	0
38 FT	11	12	8	5	7	5	7	29.9	27.3	31.5	5	6	5	7	31.3	68	80	5	10	0
40 FT	11	12	8	5	6.5	5	6.5	29.9	31.3	36.0	5	6	5	6.5	31.3	68	80	5	10	0
42 FT	11	13	8	5	6.5	5	6	29.9	27.6	31.9	5	6	5	7	31.3	69	81	5	9.5	0
44 FT	12	13	8	5	6.5	5	6.5	29.9	28.0	32.3	5	6	5	6.5	32.0	69	81	5	9.5	0
46 FT	12	13	8	5	6	5	6	29.9	32.0	36.8	5	6	5	6	31.3	69	81	5	9.5	0
48 FT	12	14	9	5	6	5	7	30.4	28.4	32.5	6	8	5	8	31.8	70	82	5	9.5	0
50 FT	13	14	9	5	6	5	7.5	30.4	29.5	33.9	6	8	5	7.5	32.4	70	82	5	9	0

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET HE[GHT (HT): 3 THRU 8 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

SHEET NO. 3 OF 14

J3 BAR	P1 BAR	2" CL.	
		1	

# ALTERNATE J3 BAR

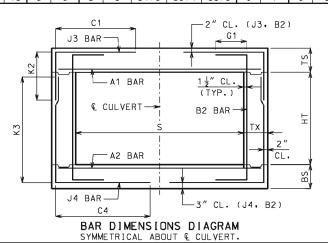
ALIERNAIE J3 BAR

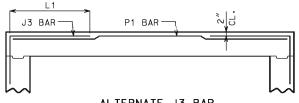
AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

							_				LOUT			7 -	T 00	4 5 7	- 00					$\equiv$
				`	SPAN	(5)				H	IGHT	(HT	') =	3 F			<u> </u>	5 FT				
		EMBE					TOP	SLAB I							BOTTO		BARS			₩Al		
DESIGN	IH.	CKN	-55	A1	BARS			J3	BARS			A2	BARS			J4	BARS			Ba	2 BARS	S
FILL	TS	BS	Тх	SIZE	SPA.	SIZE	SPA.	C1		K2	I	SIZE	SPA.	SIZE	SPA.	C4		К3		SIZE	SPA.	G1
									HT=3'	HT=4'	HT=5'						HT=3'	HT=4'	HI=5.			
1 FT	10	8	8	5	8	4	9	51.3	26.5	33.0	39.4	5	8	5	6	41.6	40	52	64	5	12	12
2 FT	11	8	8	5	7.5	4	9.5	51.3	27.0	33.5	40.0	5	8	6	7.5	36.0	40	52	64	5	12	12
4 FT	8	8	8	4	6.5	4	7.5	32.8	24.5	30.6	36.9	5	8.5	4	6.5	32.0	40	52	64	5	12	0
6 FT	8	8	8	4	7	4	8	30.4	24.5	30.6	36.9	5	9	4	7	30.4	40	52	64	5	12	0
8 FT	8	8	8	4	6.5	4	7.5	29.6	24.5	30.6	36.9	5	8.5	4	6.5	29.6	40	52	64	5	12	0
10 FT	8	8	8	4	7	4	8	27.3	24.5	30.6	36.9	4	6	4	7	27.3	40	52	64	5	12	0
12 FT	8	8	8	4	6	4	7	27.3	24.5	30.6	36.9	5	8	4	6	27.3	40	52	64	5	12	0
14 FT	8	8	8	4	6	4	6	27.3	24.5	30.6	36.9	5	8	5	6	27.3	40	52	64	5	12	0
16 FT	8	8	8	4	6	5	6	27.3	28.3	35.4	42.6	5	8	6	7	30.4	40	52	64	5	12	0
18 FT	8	9	8	5	8.5	6	7.5	30.4	24.0	30.0	36.0	5	7.5	4	6	26.4	41	53	65	5	12	0
20 FT	8	9	8	5	7.5	6	7.5	30.4	28.4	35.4	42.5	5	7	5	6.5	26.4	41	53	65	5	12	0
22 FT	9	10	8	5	7.5	5	6.5	26.4	25.0	31.0	37.0	5	7	4	6.5	25.6	42	54	66	5	12	0
24 FT	9	11	8	5	7	5	6.5	26.4	25.5	31.5	37.5	5	6.5	4	7	24.8	43	55	67	5	12	0
26 FT	10	11	8	5	7	5	7.5	26.4	26.0	32.0	38.0	5	6.5	4	6.5	25.6	43	55	67	5	12	0
28 FT	10	12	8	5	6.5	5	7.5	26.4	26.5	32.5	38.5	5	6	4	7	24.8	44	56	68	5	12	0
30 FT	11	12	8	5	6.5	5	8.5	25.6	27.0	33.0	39.0	5	6	4	6	24.8	44	56	68	5	12	0
32 FT	11	13	8	5	6	5	8	25.6	27.5	33.5	39.5	5	6	4	7	24.8	45	57	69	5	12	0
34 FT	12	13	8	5	6	5	8.5	25.6	28.0	34.0	40.0	5	6	4	6	24.8	45	57	69	5	12	0
36 FT	12	14	8	6	8	5	8.5	25.6	28.5	34.5	40.5	6	8	4	6.5	24.8	46	58	70	5	12	0
38 FT	13	14	8	6	8	5	8.5	24.8	29.0	35.0	41.0	6	8	4	6	24.8	46	58	70	5	12	0
40 FT	13	14	8	6	7.5	5	8.5	24.8	29.0	35.0	41.0	6	7.5	5	9	24.8	46	58	70	5	12	0
42 FT	14	15	8	6	8	5	8.5	24.8	30.0	36.0	42.0	6	7.5	4	6	24.8	47	59	71	5	12	0
44 FT	14	15	8	6	7.5	5	8.5	24.8	30.0	36.0	42.0	6	7.5	5	8.5	24.8	47	59	71	5	12	0
46 FT	14	16	8	6	7	5	8.5	24.8	30.5	36.5	42.5	6	7	4	6	24.8	48	60	72	5	12	0
48 FT	15	16	8	6	7	5	8	29.6	31.0	37.0	43.0	6	7	5	8	25.6	48	60	72	5	12	0
50 FT	15	16	8	6	7	5	8	29.6	31.0	37.0	43.0	6	7	5	8	24.8	48	60	72	5	12	0

				SF	PAN	(S)	= 6	FT		HE	I GH1	( H	Γ) =	6 F	T OR	7 FT				
		EMBE				Τ(	OP SLA	AB BAR	S				BOT:	TOM SI	_AB BAF	₹S		₩A	LL BAI	₹S
DESIGN	TH:	ICKN	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BAI	₹S		В.	2 BAR	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	2 HT=7'	SIZE	SPA.	SIZE	SPA.	C4		3 HT=7'	SIZE	SPA.	G1
1 FT	10	8	8	5	8	4	9.5	51.3	26.4	30.1	5	8	5	6	52.8	76	88	5	12	12
2 FT	11	9	8	5	7.5	4	9.5	51.3	27.9	31.6	5	7.5	4	6.5	51.3	77	89	5	12	12
4 FT	8	8	8	4	6	4	7	51.3	24.1	27.5	5	8	4	6	51.3	76	88	5	12	0
6 FT	8	8	8	4	6.5	4	7.5	42.4	24.1	27.5	5	8	4	6	41.6	76	88	5	12	0
8 FT	8	8	8	4	6.5	4	7	38.4	24.1	27.5	5	8	5	6.5	38.4	76	88	5	12	0
10 FT	8	8	8	4	7	4	7.5	32.8	24.1	27.5	5	8.5	4	6	33.6	76	88	5	12	0
12 FT	8	9	8	4	6	4	6	32.8	24.4	27.9	5	8	4	7	33.6	77	89	5	12	0
14 FT	8	9	8	4	6	5	6.5	32.0	24.4	27.9	5	7.5	4	6	32.8	77	89	5	12	0
16 FT	8	9	8	4	6	6	7.5	35.3	28.5	32.6	5	7.5	5	6.5	32.8	77	89	5	12	0
18 FT	8	9	8	5	8.5	6	7.5	34.4	28.5	32.6	5	7.5	6	7.5	35.3	77	89	5	12	0
20 FT	8	9	8	5	7.5	6	7.5	34.4	28.5	32.6	5	6.5	6	7	35.3	77	89	5	12	0
22 FT	9	10	8	5	7.5	5	6	32.0	25.8	29.4	5	7	5	6	32.8	78	90	5	12	0
24 FT	9	11	8	5	7	6	7	34.4	29.6	33.6	5	6.5	5	6.5	32.8	79	91	5	12	0
26 FT	10	11	8	5	6.5	5	6	32.0	30.8	35.0	5	6.5	5	6	32.8	79	91	5	11	0
28 FT	10	12	8	5	6.5	6	7	34.4	30.3	34.4	5	6	5	6.5	33.6	80	92	5	10.5	0
30 FT	11	12	8	5	6.5	5	6	32.0	31.5	35.8	5	6	5	6	33.6	80	92	5	9.5	0
32 FT	11	13	8	5	6	6	7	35.3	31.9	36.0	5	6	5	6	33.6	81	93	5	9.5	0
34 FT	11	13	8	6	7.5	6	6.5	35.3	31.9	36.0	5	6	5	6	33.6	81	93	5	9.5	0
36 FT	12	13	8	6	8	6	7	35.3	32.3	36.4	6	8	6	7	36.8	81	93	5	9.5	0
38 FT	12	14	8	6	8	6	6.5	35.3	32.5	36.8	6	8	5	6	34.4	82	94	5	9.5	0
40 FT	13	14	9	6	8	5	6	32.4	33.9	38.1	6	8	5	6.5	34.0	82	94	5	8.5	0
42 FT	13	15	10	6	8	5	7	32.8	33.3	37.5	6	7.5	5	7.5	34.5	83	95	5	9	0
44 FT	14	15	10	6	8	5	7.5	32.8	34.5	38.9	6	7.5	5	7.5	34.5	83	95	5	8.5	0
46 FT	14	16	11	6	7.5	5	7	33.3	34.9	39.3	6	7	5	7	34.9	84	96	5	9	0
48 FT	14	16	11	6	7.5	5	6.5	33.3	34.9	39.3	6	7	5	7	34.9	84	96	5	9	0
50 FT	15	16	11	6	7.5	5	7	38.1	35.3	39.6	6	7	5	7	34.9	84	96	5	8.5	0

				SF	PAN	(S)	= 6	FT		HE	I GH 1	(H)	Γ) =	8 F	T OR	9 FT				
	М	EMBE	R			Τſ	OP SLA	AB BARS	5				вот	TOM SI	LAB BAI	RS		₩AI	L BAF	₹S
DESIGN	TH1	CKNE	ESS	A 1	BARS			J3 BA	RS		A2	BARS			J4 BA	RS		B2	2 BARS	5
FILL	TS	BS	TX	SIZE	SPA.	S I ZE	SPA.	C1	HT=8'	2 HT=9'	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	3 HT=9'	SIZE	SPA.	G1
1 FT	10	10	8	5	8	4	7	51.3	26.6	29.5	5	7	4	6.5	51.3	102	114	5	12	12
2 FT	11	10	8	5	7.5	4	7	51.3	28.0	31.0	5	7	4	6	51.3	102	114	5	12	12
4 FT	8	9	9	4	6	4	6.5	51.9	24.9	27.6	5	8	4	6.5	51.9	101	113	5	12	0
6 FT	8	9	9	4	6.5	4	6.5	51.9	24.9	27.6	5	8.5	4	6	51.9	101	113	5	12	0
8 FT	8	10	9	4	6.5	4	6	51.9	25.1	27.9	4	6	4	6	51.9	102	114	5	11.5	0
10 FT	8	10	9	4	7.5	4	6.5	45.4	25.1	27.9	4	6.5	4	6.5	51.9	102	114	5	12	0
12 FT	8	10	თ	4	6	5	6.5	43.8	25.1	27.9	5	8.5	4	6	51.9	102	114	5	11.5	0
14 FT	8	10	თ	4	6	5	6	42.1	26.1	29.0	5	7.5	5	6.5	54.3	102	114	5	10	0
16 FT	8	10	g,	4	6	6	7	44.5	28.4	31.5	5	7	5	6	54.3	102	114	5	9.5	0
18 FT	8	10	9	5	9	6	7	43.8	29.4	32.6	5	7	6	7	55.9	102	114	5	8.5	0
20 FT	9	10	9	5	8.5	5	6	43.8	29.8	33.0	5	7	6	6.5	56.8	102	114	5	8.5	0
22 FT	9	11	9	5	8	5	6	42.9	30.0	33.3	5	6.5	6	6.5	55.9	103	115	5	8.5	0
24 FT	10	11	9	5	7.5	5	6	45.4	30.3	33.5	5	6.5	6	6	55.9	103	115	5	8.5	0
26 FT	10	11	9	5	7	5	6	44.5	30.3	33.5	5	6	6	6	55.9	103	115	5	8.5	0
28 FT	10	12	9	5	6.5	6	7	47.0	31.6	35.0	5	6	6	6	55.9	104	116	5	8	0
30 FT	11	12	9	5	6.5	6	6.5	49.4	35.4	39.0	5	6	6	6	55.9	104	116	5	8	0
32 FT	11	13	10	5	6.5	6	8	46.8	32.3	35.5	5	6	6	6.5	56.6	105	117	5	8	0
34 FT	12	13	11	5	6.5	5	6.5	44.0	32.5	35.9	5	6	5	6	49.8	105	117	5	7.5	0
36 FT	12	13	11	5	6	5	6.5	44.0	32.5	35.9	6	8	6	7.5	52.3	105	117	5	7.5	0
38 FT	12	14	12	5	6	5	6	42.0	32.8	36.1	6	8	5	6	48.8	106	118	5	7	0
40 FT	13	14	12	5	6	5	6	44.5	33.0	36.4	6	8	5	6	48.8	106	118	5	7	0
42 FT	13	15	12	5	6	5	6	43.6	33.4	36.6	6	7.5	5	6	52.1	107	119	5	7	0
44 FT	14	15	13	5	6	5	6	44.3	34.8	38.3	6	7.5	5	6	48.5	107	119	5	6.5	0
46 FT	14	15	13	6	8	5	6	44.3	34.8	38.3	6	7.5	6	8	51.0	107	119	5	6.5	0
48 FT	14	16	13	6	8	5	6	44.3	35.1	38.6	6	7	5	6	50.1	108	120	5	6.5	0
50 FT	15	16	13	6	8	5	6	51.0	35.4	38.9	6	7	6	8	53.5	108	120	5	6.5	0





# ALTERNATE J3 BAR

ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

CONCRETE

SPAN (S): 6 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 3 THRU 9 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

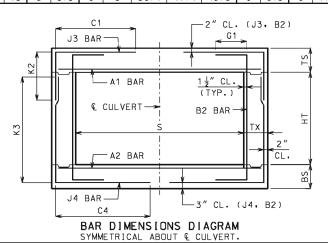
703.17

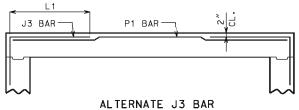
SHEET NO. 4 OF 14

				S	PAN	(S)	= 7	FT		HE	IGHT	(HT	·) =	4 F	T OR	5 FT	OR	6 FT				
	М	EMBE	R				TOP	SLAB E	BARS					E	BOTTON	SLAB	BARS			WAI	LL BAI	RS
DESIGN		CKN		Α1	BARS			J3	BARS			A2	BARS			J4	BARS			В:	2 BAR	s
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	K2 HT=5'	HT=6'	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	K3 HT=5'	HT=6'	SIZE	SPA.	G1
1 FT	11	9	8	5	7.5	4	9	57.0	27.1	32.3	37.4	5	7.5	4	6	54.3	53	65	77	5	12	12
2 FT	11	9	8	5	7.5	4	9	57.0	27.1	32.3	37.4	5	7.5	5	7	43.3	53	65	77	5	12	12
4 FT	8	8	8	4	6	4	6	36.8	24.3	29.1	34.0	5	8	5	6	35.9	52	64	76	5	12	0
6 FT	8	8	8	4	6	4	6	33.1	24.3	29.1	34.0	5	8	5	6	33.1	52	64	76	5	12	0
8 FT	8	9	8	4	6	5	6.5	32.3	24.0	28.8	33.6	5	7.5	4	6.5	32.3	53	65	77	5	12	0
10 FT	8	9	8	4	6	4	6	30.4	24.0	28.8	33.6	5	7.5	4	7.5	29.5	53	65	77	5	12	0
12 FT	8	9	8	4	6	5	6	30.4	24.0	28.8	33.6	5	7.5	4	6	28.5	53	65	77	5	12	0
14 FT	8	9	8	5	8	6	7.5	33.1	28.3	33.9	39.5	5	7	5	6.5	28.5	53	65	77	5	12	0
16 FT	8	9	8	5	7	6	7	33.1	28.3	33.9	39.5	5	6.5	6	7.5	31.3	53	65	77	5	12	0
18 FT	9	10	8	5	7	5	6.5	28.5	25.4	30.4	35.3	5	6	5	7	28.5	54	66	78	5	12	0
20 FT	9	10	8	5	6	5	6	28.5	29.1	34.8	40.4	6	8	5	6	27.6	54	66	78	5	12	0
22 FT	10	11	8	5	6	5	7	28.5	26.3	31.1	36.1	6	8	5	7.5	27.6	55	67	79	5	12	0
24 FT	10	12	8	6	8	5	6	28.5	26.0	30.8	35.6	6	8	5	8.5	26.6	56	68	80	5	12	0
26 FT	11	13	8	6	8	5	7	27.6	27.5	32.4	37.3	6	8	5	8.5	26.6	57	69	81	5	12	0
28 FT	12	13	8	6	7.5	5	8	27.6	28.5	33.6	38.6	6	7.5	5	8.5	27.6	57	69	81	5	12	0
30 FT	12	14	8	6	7.5	5	7	27.6	28.3	33.3	38.1	6	7.5	5	8.5	26.6	58	70	82	5	12	0
32 FT	13	14	8	6	7	5	8	26.6	29.4	34.5	39.5	6	7	5	8.5	27.6	58	70	82	5	12	0
34 FT	13	15	8	6	7	5	7	27.6	29.1	34.0	39.0	6	7	5	8.5	26.6	59	71	83	5	12	0
36 FT	14	15	8	6	6.5	5	7.5	26.6	30.3	35.3	40.4	6	7	5	8.5	27.6	59	71	83	5	12	0
38 FT	14	16	8	6	6.5	5	7	26.6	30.6	35.8	40.8	6	7	5	8	26.6	60	72	84	5	11.5	0
40 FT	15	16	8	6	6.5	5	7.5	32.3	31.1	36.1	41.1	6	6.5	5	8	27.6	60	72	84	5	10.5	0
42 FT	15	17	8	6	6	5	7	32.3	35.3	40.9	46.5	6	6.5	5	7	27.6	61	73	85	5	10	0
44 FT	16	17	8	6	6	5	7	32.3	36.5	42.3	48.0	6	6.5	5	7	27.6	61	73	85	5	9.5	0
46 FT	16	18	8	6	6	5	6	32.3	36.3	41.9	47.5	6	6.5	5	6.5	27.6	62	74	86	5	9.5	0
48 FT	17	18	9	6	6	5	7.5	32.5	33.5	38.8	43.9	6	6.5	5	8	27.9	62	74	86	5	10	0
50 FT	17	19	9	6	6	5	7	32.5	37.1	42.8	48.4	6	6	5	7.5	27.9	63	75	87	5	9	0

				SF	PAN	(S)	= 7	FT		HE	I GH 1	Г (Н]	Γ) =	: 7 F	T OR	8 FT				
		EMBE				T(	OP SLA	AB BARS	5				BOT:	TOM SI	_AB BAF	₹S		WAL	L BA	₹S
DESIGN	TH]	CKNE	ESS	Α1	BARS			J3 BA			A2	BARS			J4 BAI			B	2 BAR	3
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	2 HT=8'	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	3 HT=8'	SIZE	SPA.	G1
1 FT	11	9	8	5	7.5	4	8	57.0	27.8	31.1	5	7.5	5	6.5	58.9	89	101	5	12	12
2 FT	11	9	8	5	7.5	4	7.5	57.0	27.8	31.1	5	7.5	5	6	58.9	89	101	5	12	12
4 FT	8	9	8	4	6	5	6.5	58.9	24.0	27.0	5	7.5	4	6	57.0	89	101	5	12	0
6 FT	8	9	8	4	6	5	6.5	46.0	25.0	28.1	5	7.5	5	6.5	50.6	89	101	5	12	0
8 FT	8	9	8	4	6	5	6	41.4	25.0	28.1	5	7.5	5	6.5	44.1	89	101	5	12	0
10 FT	8	g	8	4	6	5	6.5	35.9	25.0	28.1	5	7.5	5	6.5	36.8	89	101	5	12	0
12 FT	8	9	8	4	6	6	7.5	38.6	28.8	32.4	5	7.5	5	6	36.8	89	101	5	12	0
14 FT	8	9	8	5	8	6	7.5	37.8	28.8	32.4	5	7	6	6.5	38.6	89	101	5	12	0
16 FT	8	9	8	5	7	6	7	37.8	32.6	36.8	5	6	6	6	38.6	89	101	5	12	0
18 FT	9	10	8	5	6.5	6	7	37.8	29.4	33.0	5	6	6	6.5	38.6	90	102	5	12	0
20 FT	თ	10	8	5	6	6	7	36.8	33.4	37.4	6	7.5	6	6	38.6	90	102	5	11	0
22 FT	10	11	9	5	6	5	6	34.4	30.0	33.6	6	8	5	6	35.4	91	103	5	12	0
24 FT	10	12	9	6	8.5	5	6	34.4	30.3	33.9	6	8	5	6.5	36.3	92	104	5	11	0
26 FT	11	13	9	6	8	6	7.5	38.1	31.9	35.6	6	8	5	6.5	36.3	93	105	5	10	0
28 FT	11	13	9	6	7	6	7	37.3	31.9	35.6	6	7.5	5	6	36.3	93	105	5	9.5	0
30 FT	12	13	9	6	7.5	6	7.5	37.3	33.3	37.1	6	7	6	7.5	39.0	93	105	5	8.5	0
32 FT	12	14	9	6	6.5	6	6.5	37.3	32.5	36.3	6	7	5	6	36.3	94	106	5	8.5	0
34 FT	13	14	9	6	7	6	7	38.1	33.9	37.8	6	7	6	7	39.0	94	106	5	8.5	0
36 FT	14	15	10	6	7	5	6.5	34.8	34.5	38.4	6	7	5	7	36.6	95	107	5	8	0
38 FT	14	16	11	6	7	5	6.5	36.1	34.9	38.8	6	7	5	7	37.0	96	108	5	8.5	0
40 FT	15	16	11	6	7	5	6.5	40.9	35.3	39.0	6	7	5	7	37.0	96	108	5	8	0
42 FT	15	17	11	6	6.5	5	6	40.9	35.5	39.4	6	7	5	7	37.0	97	109	5	7.5	0
44 FT	16	17	12	6	6.5	5	6.5	41.3	37.0	40.9	6	6.5	5	6.5	37.5	97	109	5	8	0
46 FT	16	18	12	6	6.5	5	6.5	41.3	36.1	40.0	6	6.5	5	6.5	37.5	98	110	5	8	0
48 FT	17	18	12	6	6.5	5	6.5	41.3	37.6	41.6	6	6.5	5	6.5	38.4	98	110	5	7.5	0
50 FT	17	18	12	6	6	5	6	41.3	37.6	41.6	6	6	5	6.5	38.4	98	110	5	7	0

				SPA	AN C	S) =	= 7 F	Т		HE I	GHT	(HT	) =	9 FT	OR 1	0 FT				
		EMBE				Τſ	OP SL	AB BARS	5				BOT	TOM SI	_AB BAF	₹S		₩Al	L BAI	₹S
DESIGN	THI	CKNE	ESS	A1	BARS			J3 BA	RS		A2	BARS			J4 BAI	₹S		B2	2 BAR	S
FILL	TS	BS	TX	SIZE	SPA.	S I ZE	SPA.	C1		2 HT=10'	S I ZE	SPA.	SIZE	SPA.	C4	HT=9'	.3 HT=10	SIZE	SPA.	G1
1 FT	11	10	8	5	7.5	4	6	57.0	27.3	29.9	5	7	5	6.5	58.9	114	126	5	12	12
2 FT	11	10	8	5	7.5	5	8.5	58.9	28.5	31.3	5	7	5	6	58.9	114	126	5	11	12
4 FT	8	9	9	4	6	5	6	59.5	28.8	31.6	5	7.5	5	6	59.5	113	125	5	10.5	0
6 FT	8	10	9	4	6	5	6	59.5	29.0	31.9	5	7	5	6.5	59.5	114	126	5	10	0
8 FT	8	10	9	4	6	6	7	62.3	29.0	31.9	5	7	5	6	59.5	114	126	5	9	0
10 FT	8	10	9	4	6	5	6	46.5	26.6	29.3	5	7.5	5	6	59.5	114	126	5	10	0
12 FT	8	11	9	4	6	6	7	47.4	25.6	28.1	5	7	5	6	59.5	115	127	5	9	0
14 FT	8	11	9	5	8.5	6	7	46.5	29.3	32.1	5	6.5	6	7	62.3	115	127	5	8.5	0
16 FT	9	11	9	5	8	5	6	46.5	29.5	32.4	5	6.5	6	6.5	62.3	115	127	5	8.5	0
18 FT	9	11	9	5	7	6	7	48.4	30.8	33.8	5	6.5	6	6	64.1	115	127	5	8.5	0
20 FT	10	11	9	5	7	6	7.5	50.3	31.0	34.0	5	6	6	6	60.5	115	127	5	8.5	0
22 FT	10	12	9	5	6.5	6	6.5	49.3	31.3	34.3	5	6	6	6	62.3	116	128	5	8	0
24 FT	11	12	9	5	6	6	7	51.1	35.3	38.6	6	8.5	6	6	64.1	116	128	5	7.5	0
26 FT	11	13	10	5	6	6	7.5	48.9	33.0	36.1	5	6	6	6.5	60.1	117	129	5	8	0
28 FT	12	13	11	5	6	5	6.5	45.6	32.0	35.0	6	8	6	7	54.1	117	129	5	7.5	0
30 FT	12	14	11	6	8	5	6	45.6	32.3	35.3	6	8	6	7	56.0	118	130	5	7.5	0
32 FT	13	14	12	6	8	5	6	46.1	33.8	36.9	6	7.5	6	8	52.8	118	130	5	7	0
34 FT	13	15	12	6	8	5	6	45.1	34.0	37.1	6	7.5	6	8	55.6	119	131	5	7	0
36 FT	14	15	12	6	7.5	6	8	49.9	35.6	38.9	6	7.5	6	7.5	54.8	119	131	5	7	0
38 FT	14	16	13	6	7.5	5	6	45.6	34.6	37.8	6	7	6	8	54.4	120	132	5	6.5	0
40 FT	15	16	13	6	7.5	6	8	55.3	36.1	39.4	6	7	6	7.5	54.4	120	132	5	6.5	0
42 FT	15	17	13	6	7	6	7.5	55.3	36.5	39.8	6	7	6	7.5	56.3	121	133	5	6.5	0
44 FT	16	17	14	6	7	6	8	55.9	38.1	41.5	6	7	6	7.5	53.9	121	133	5	6	0
46 FT	16	17	14	6	7	6	7.5	55.9	38.1	41.5	6	6.5	6	7	53.9	121	133	5	6	0
48 FT	16	18	14	6	6.5	6	7	55.9	37.0	40.3	6	6.5	6	7.5	55.9	122	134	5	6	0
50 FT	17	18	15	6	6.5	6	8	56.4	41.4	45.0	6	6.5	6	7.5	53.5	122	134	6	8	0





ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

CONCRETE

SPAN (S): 7 FEET HE[GHT (HT): 4 THRU 10 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

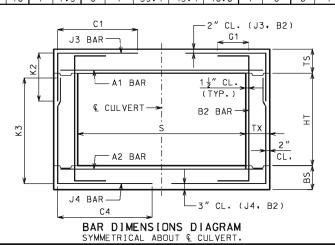
703.17

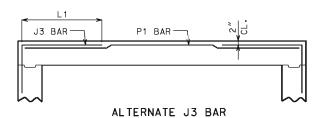
SHEET NO. 5 OF 14

				_	DAN	<i>(</i> C )	_ ^	CT			LOUT	/ 117		4 5	T 00	c c .	. 00	c ct				$\equiv$
l				`	SPAN	(S)	= 8	FT		H	EIGHT	(HT	') =		T OR			6 FT				
		EMBE					TOP	SLAB I							BOTTO	/ SLAB				₩AL		-
DESIGN	IH.	ICKN	-55	A1	BARS			J3	BARS			A2	BARS			J4	BARS			B2	2 BARS	Š
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1		K2		SIZE	SPA.	SIZE	SPA.	C4		K3		SIZE	SPA.	G1
	_ ' `	55	'^	J 1 Z L	J. A.	JIZL	5, 7.	01	HT=4'	HT=5'	HT=6'	3126	J. A.	312	J. A.	0 1	HT=4'	HT=5'	HT=6'	JIZL	51 7.	
1 FT	12	9	8	5	7	4	8.5	63.5	28.1	33.5	38.8	5	7.5	5	6	44.8	53	65	77	5	12	12
2 FT	12	9	8	5	7	4	8	63.5	28.1	33.5	38.8	5	7	6	7.5	43.6	53	65	77	5	12	12
4 FT	8	8	8	5	8	6	7.5	38.5	32.5	39.0	45.6	5	6.5	6	6	38.5	52	64	76	5	12	0
6 FT	8	8	8	5	8.5	6	7.5	37.5	32.5	39.0	45.6	5	7	6	6	36.4	52	64	76	5	12	0
8 FT	8	8	8	5	8	6	7.5	36.4	32.5	39.0	45.6	5	6.5	6	6	35.4	52	64	76	5	12	0
10 FT	8	8	8	5	8.5	6	7.5	34.4	32.5	39.0	45.6	5	7	6	6	34.4	52	64	76	5	12	0
12 FT	8	9	8	5	7.5	6	7.5	34.4	32.4	38.9	45.4	5	6.5	6	7.5	32.3	53	65	77	5	12	0
14 FT	8	9	8	5	6.5	6	6.5	34.4	32.4	38.9	45.4	6	8	6	7	32.3	53	65	77	5	12	0
16 FT	9	10	8	5	6	5	6	30.1	29.1	34.8	40.4	6	8	5	6.5	28.1	54	66	78	5	12	0
18 FT	9	11	8	6	7.5	6	7	33.3	29.6	35.3	40.9	6	7.5	5	7.5	27.0	55	67	79	5	12	0
20 FT	10	12	8	6	7.5	5	6	29.1	26.0	30.8	35.6	6	7.5	5	8.5	26.0	56	68	80	5	12	0
22 FT	11	13	8	6	7	5	6.5	28.1	27.5	32.4	37.3	6	7	5	8.5	26.0	57	69	81	5	12	0
24 FT	12	13	8	6	7	5	7.5	27.0	32.6	38.4	44.1	6	7	5	8	26.0	57	69	81	5	12	0
26 FT	13	14	8	6	7	5	8	27.0	29.4	34.5	39.5	6	7	5	8.5	26.0	58	70	82	5	12	0
28 FT	13	15	8	6	6.5	5	7	27.0	29.1	34.0	39.0	6	6.5	5	8.5	26.0	59	71	83	5	12	0
30 FT	14	15	8	6	6	5	7.5	26.0	30.3	35.3	40.4	6	6.5	5	8.5	26.0	59	71	83	5	12	0
32 FT	15	16	8	6	6	5	7.5	31.3	35.5	41.3	47.0	6	6.5	5	8	26.0	60	72	84	5	12	0
34 FT	15	17	8	6	6	5	7	31.3	31.5	36.5	41.6	6	6.5	5	7	26.0	61	73	85	5	12	0
36 FT	16	17	8	6	6	5	7	31.3	32.6	37.9	43.0	6	6	5	7	26.0	61	73	85	5	12	0
38 FT	16	18	8	7	7.5	5	7	31.3	36.3	41.9	47.5	6	6	5	6.5	26.0	62	74	86	5	11.5	0
40 FT	17	18	8	7	7.5	5	6.5	31.3	37.5	43.3	49.0	6	6	5	6.5	26.0	62	74	86	5	10.5	0
42 FT	17	19	8	7	7	5	6.5	31.3	37.1	42.8	48.4	6	6	5	6.5	26.0	63	75	87	5	10	0
44 FT	18	19	8	7	7	5	6.5	30.1	38.4	44.1	49.9	7	7.5	5	6.5	26.0	63	75	87	5	9.5	0
46 FT	18	20	8	7	7	5	6	31.3	38.1	43.8	49.4	7	7.5	5	6	26.0	64	76	88	5	9.5	0
48 FT	19	20	8	7	7	5	6	31.3	39.4	45.1	50.9	7	7.5	5	6	26.0	64	76	88	5	9.5	0
50 FT	19	20	8	7	6.5	5	6	31.3	39.4	45.1	50.9	7	7	6	7.5	29.1	64	76	88	5	9.5	0

				S	PAN	(S)	= 8	FT		HE	IGHT	(HT	`) =	7 F	T OR	8 FT	OR 9	9 FT				
		EMBE					TOP	SLAB E	BARS					E	BOTTO	/ SLAB	BARS			WΑ	LL BAF	₹S
DESIGN	THI	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			B	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	K2 HT=8'	HT=9'	SIZE	SPA.	S I ZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	S I ZE	SPA.	G1
1 FT	12	10	8	5	7	4	6.5	63.5	28.3	31.6	35.0	5	7	5	6.5	65.5	90	102	114	5	12	12
2 FT	12	10	8	5	7	4	6	63.5	28.3	31.6	35.0	5	7	5	6.5	65.5	90	102	114	5	12	12
4 FT	8	g	8	5	7.5	6	7.5	66.5	28.8	32.4	36.0	5	6.5	6	6.5	66.5	89	101	113	5	12	0
6 FT	8	9	8	5	8	6	7.5	53.0	28.8	32.4	36.0	5	7	6	6.5	58.3	89	101	113	5	12	0
8 FT	8	9	8	5	7.5	6	7.5	47.9	28.8	32.4	36.0	5	6.5	6	6	51.0	89	101	113	5	11.5	0
10 FT	8	9	8	5	8	6	7.5	41.6	28.8	32.4	36.0	5	7	6	6	43.6	89	101	113	5	12	0
12 FT	8	9	9	5	7.5	6	7	41.0	32.6	36.8	40.8	5	6.5	6	6.5	42.0	89	101	113	5	12	0
14 FT	8	10	9	5	6.5	6	6.5	41.0	28.1	31.6	35.1	5	6	6	7	42.0	90	102	114	5	12	0
16 FT	9	10	9	5	6	6	7.5	41.0	29.4	33.0	36.6	6	7.5	6	6.5	42.0	90	102	114	5	12	0
18 FT	9	11	9	6	8	6	6.5	39.9	29.8	33.3	36.9	6	7.5	6	7	42.0	91	103	115	5	11	0
20 FT	10	11	9	6	7.5	6	7	39.9	30.0	33.6	37.3	6	6.5	6	6	42.0	91	103	115	5	10	0
22 FT	11	12	9	6	7.5	6	7	39.9	31.6	35.4	39.0	6	7	6	6.5	42.0	92	104	116	5	9	0
24 FT	11	13	9	6	6.5	6	6.5	39.9	31.9	35.6	39.4	6	6.5	6	7	42.0	93	105	117	5	8.5	0
26 FT	12	14	10	6	7	5	6	38.1	32.5	36.3	40.0	6	7	5	6.5	39.3	94	106	118	5	9	0
28 FT	13	15	10	6	7	6	7.5	40.3	33.1	36.9	40.6	6	7	5	6.5	39.3	95	107	119	5	8	0
30 FT	13	15	10	6	6.5	6	6.5	40.3	33.1	36.9	40.6	6	6.5	5	6	39.3	95	107	119	5	8	0
32 FT	14	16	11	6	6.5	6	8.5	40.6	34.9	38.8	42.5	6	6.5	5	7	39.6	96	108	120	5	8	0
34 FT	15	17	11	6	6.5	6	8	47.1	35.5	39.4	43.3	6	6.5	5	7	39.6	97	109	121	5	7.5	0
36 FT	15	17	11	6	6	6	7	47.1	35.5	39.4	43.3	6	6	5	6.5	39.6	97	109	121	5	7.5	0
38 FT	16	18	12	6	6	6	8	47.5	36.1	40.0	43.9	6	6	5	6.5	40.0	98	110	122	5	7.5	0
40 FT	17	18	12	6	6	6	8	47.5	37.6	41.6	45.5	6	6	5	6.5	40.0	98	110	122	5	7	0
42 FT	17	19	12	7	8	6	7.5	47.5	38.0	41.9	45.9	6	6	5	6.5	41.0	99	111	123	5	7	0
44 FT	18	19	13	7	8	5	6	44.8	38.3	42.3	46.3	6	6	5	6	40.4	99	111	123	5	7	0
46 FT	18	20	13	7	7.5	6	8	48.0	38.6	42.6	46.5	7	8	5	6	41.4	100	112	124	5	6.5	0
48 FT	19	20	13	7	7.5	6	8	48.0	40.1	44.3	48.3	7	7.5	5	6	41.4	100	112	124	5	6.5	0
50 FT	19	21	13	7	7	6	7	48.0	39.3	43.3	47.3	7	7.5	5	6	41.4	101	113	125	5	6.5	0

				SPA	AN C	S) =	= 8 F	Т		HEI	GHT	(HT	) =	10 F	T OR	11 F	Т			
		EMBE				ΤC	OP SLA	AB BAR	S				BOT	TOM S	LAB BAF	₹S		₩Al	_L BAI	₹S
DESIGN	TH:	CKN	ESS	A 1	BARS			J3 BA			A2	BARS			J4 BAI	₹\$		B2	2 BAR	S
FILL	TS	BS	ΤX	SIZE	SPA.	S I ZE	SPA.	C1	HT=10'	2 HT=11'	SIZE	SPA.	SIZE	SPA.	C4	K HT=10'	.3 HT=11	SIZE	SPA.	G1
1 FT	11	10	8	5	6.5	5	7.5	65.5	31.3	34.0	5	6.5	6	6.5	66.5	126	138	5	9.5	12
2 FT	11	10	8	5	6.5	5	7	65.5	31.3	34.0	5	6	6	6	66.5	126	138	5	9.5	12
4 FT	8	9	9	5	7.5	6	7	68.3	33.0	36.0	5	6	6	6	68.3	125	137	5	8.5	0
6 FT	8	10	9	5	8.5	6	7	68.3	30.6	33.4	5	7	6	6.5	68.3	126	138	5	8.5	0
8 FT	8	10	9	5	8	6	7	68.3	33.3	36.3	5	7	6	6	68.3	126	138	5	8.5	0
10 FT	8	10	9	5	8.5	6	7	52.5	30.6	33.4	5	7	6	6	68.3	126	138	5	8.5	0
12 FT	8	10	9	5	7.5	6	6.5	50.4	33.3	36.3	5	6.5	6	6	65.1	126	138	5	8.5	0
14 FT	9	11	9	5	7	6	7	52.5	31.0	33.8	5	6.5	6	6	69.3	127	139	5	8.5	0
16 FT	9	11	9	5	6	6	6	50.4	33.8	36.8	6	8	6	6	64.0	127	139	5	8.5	0
18 FT	10	12	9	5	6	6	6	52.5	34.3	37.3	6	8	6	6	68.3	128	140	5	8	0
20 FT	11	12	10	5	6	5	6	48.8	31.8	34.5	6	7.5	6	6.5	58.3	128	140	5	8	0
22 FT	11	13	10	6	8	6	7	50.9	33.4	36.3	6	7.5	6	6.5	60.4	129	141	5	7.5	0
24 FT	12	13	11	6	7.5	6	8	51.4	33.6	36.5	6	7	6	7	56.8	129	141	5	7.5	0
26 FT	12	14	11	6	7	6	7.5	50.3	33.9	36.8	6	7	6	7	57.8	130	142	5	7.5	0
28 FT	13	15	12	6	7.5	6	8	50.8	34.4	37.3	6	7	6	7.5	57.3	131	143	5	7	0
30 FT	14	15	12	6	7	6	7.5	51.9	36.0	39.0	6	6.5	6	7	57.3	131	143	5	7	0
32 FT	14	16	13	6	7	6	8	51.3	36.3	39.3	6	6.5	6	7.5	56.6	132	144	5	6.5	0
34 FT	15	16	13	6	6.5	6	7.5	57.8	36.5	39.5	6	6.5	6	7	55.6	132	144	5	6.5	0
36 FT	15	17	13	6	6.5	6	6.5	57.8	36.8	39.8	6	6.5	6	7	57.8	133	145	5	6.5	0
38 FT	16	18	14	6	6.5	6	7.5	58.3	37.3	40.3	6	6.5	6	7.5	57.3	134	146	5	6	0
40 FT	16	18	14	6	6	6	7	58.3	37.3	40.3	6	6	6	7	57.3	134	146	5	6	0
42 FT	17	19	15	6	6	6	7	58.9	42.3	45.6	6	6	6	7.5	56.6	135	147	6	8	0
44 FT	17	19	15	6	6	6	6.5	57.8	42.3	45.6	6	6	6	7	56.6	135	147	6	8	0
46 FT	18	19	15	6	6	6	7	58.9	42.5	45.9	7	8	6	6	56.6	135	147	6	8	0
48 FT	18	20	16	7	8	6	7	58.3	42.9	46.3	7	8	6	7	56.0	136	148	6	8	0
50 FT	19	21	16	7	7.5	6	7	59.4	43.4	46.8	7	8	6	7	58.3	137	149	6	8	0





ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
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IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



DATE EFFECTIVE:

DATE PREPARED:

# SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

CONCRETE

SPAN (S): 8 FEET HE[GHT (HT): 4 THRU 11 FEET

04/01/2011

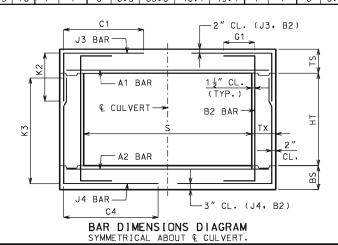
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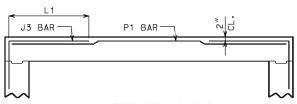
SHEET NO. 6 OF 14

						461									T 00		- 00					$\equiv$		
												(HT) = 5 FT OR 6 FT OR 7 FT												
	MEMBER TOP SLAB BARS THICKNESS A1 BARS 13 BARS										BOTTOM SLAB BARS									WALL BARS				
DESIGN	IH.	CKN	-55	A1	BARS			J3	BARS			A2	BARS			J4	BARS			B:	2 BARS	ŝ		
FILL	TS	BS	TX	S 1 7 F	SPA.	S I 7F	SPA.	C1		K2		S 1 7 F	SPA.	S 1 7F	SPA.	C4		К3	HT=7'	S 1 7F	SPA.	G1		
		50		012		0122	3. 7		HT=5'	HT=6'	HT=7'	0125		3121			HT=5'							
1 FT	12	9	8	5	6.5	4	7	69.6	28.1	32.5	37.0	5	6.5	6	7.5	54.5	65	77	89	5	12	12		
2 FT	12	9	8	5	6.5	4	7	69.6	28.1	32.5	37.0	5	6	6	7	48.8	65	77	89	5	12	12		
4 FT	8	9	8	5	6.5	6	7	42.9	32.4	37.8	43.3	5	6	6	7.5	42.9	65	77	89	5	12	0		
6 FT	8	9	8	5	7	6	7.5	40.6	32.4	37.8	43.3	5	6	6	7	39.5	65	77	89	5	12	0		
8 FT	8	10	8	5	6.5	6	7	39.5	24.1	28.0	32.0	5	6	5	6.5	33.6	66	78	90	5	12	0		
10 FT	8	10	8	5	7	6	7.5	37.1	24.1	28.0	32.0	5	6.5	4	6	31.4	66	78	90	5	12	0		
12 FT	8	10	8	5	6	6	6	37.1	28.5	33.1	37.9	6	8	5	6.5	30.1	66	78	90	5	12	0		
14 FT	9	10	8	6	7.5	6	7	34.8	29.6	34.4	39.3	6	7	5	6	30.1	66	78	90	5	12	0		
16 FT	9	11	8	6	7	6	6	34.8	29.3	33.9	38.6	6	6.5	5	7	29.0	67	79	91	5	12	0		
18 FT	10	12	8	6	6.5	6	6.5	33.6	30.0	34.8	39.4	6	6.5	5	7.5	29.0	68	80	92	5	12	0		
20 FT	11	13	8	6	6	6	7	33.6	31.6	36.4	41.3	6	6	5	8	29.0	69	81	93	5	12	0		
22 FT	12	14	8	6	6	5	6	29.0	32.4	37.3	42.0	6	6	5	8.5	27.9	70	82	94	5	12	0		
24 FT	13	15	8	6	6	5	6	29.0	29.0	33.3	37.5	6	6	5	8.5	27.9	71	83	95	5	12	0		
26 FT	14	16	8	6	6	5	6	29.0	30.6	34.9	39.3	6	6	5	8	27.9	72	84	96	5	12	0		
28 FT	15	16	8	7	7.5	5	6.5	33.6	35.3	40.1	45.1	7	8	5	8	27.9	72	84	96	5	12	0		
30 FT	15	17	8	7	7	6	8	37.1	35.6	40.6	45.5	7	7.5	5	7	27.9	73	85	97	5	11.5	0		
32 FT	16	17	8	7	7	5	6	32.5	36.1	41.0	45.9	7	7.5	5	6.5	27.9	73	85	97	5	10	0		
34 FT	17	18	8	7	7	5	6	32.5	37.8	42.9	47.9	7	7.5	5	6.5	29.0	74	86	98	5	9.5	0		
36 FT	17	19	9	7	7	5	6	33.9	37.3	42.3	47.1	7	7.5	5	7.5	29.3	75	87	99	5	10.5	0		
38 FT	18	20	9	7	7	5	6	33.9	38.1	43.0	48.0	7	7.5	5	7	29.3	76	88	100	5	9.5	0		
40 FT	19	20	9	7	6.5	5	6.5	33.9	39.5	44.5	49.5	7	7	5	7	29.3	76	88	100	5	8.5	0		
42 FT	19	21	10	7	6.5	5	6.5	34.3	39.9	45.0	50.0	7	7	5	7.5	29.5	77	89	101	5	10	0		
44 FT	20	21	10	7	6.5	5	6.5	34.3	40.4	45.4	50.4	7	6.5	5	7.5	29.5	77	89	101	5	9.5	0		
46 FT	21	22	10	7	6.5	5	6.5	34.3	41.1	46.3	51.3	7	7	5	7	29.5	78	90	102	5	8.5	0		
48 FT	21	22	10	7	6	5	6.5	34.3	41.1	46.3	51.3	7	6.5	5	7	29.5	78	90	102	5	8	0		
50 FT	22	23	10	7	6	5	6.5	34.3	42.0	47.0	52.1	7	6.5	5	6.5	30.6	79	91	103	5	8	0		
30 FT	22	23	10		0	] 3	0.3	34.3	42.0	41.0	32.1		6.3	)	0.3	30.6	13	1 31	103	5	0			

SPAN (S) = 9 FT HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT  MEMBER TOP SLAB BARS BOTTOM SLAB BARS WALL BA																						
		EMBE		TOP SLAB BARS										WΑ	WALL BARS							
FILL	THICKNESS			Α1	BARS			J3	BARS		A2 BARS			J4 BARS					B2 BARS			
	TS	BS	ΤX	SIZE	SPA.	S I ZE	SPA.	C1	HT=8'	K2 HT=9′	HT=10'	SIZE	SPA.	S I ZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10'	S I ZE	SPA.	G1
1 FT	12	11	8	5	6.5	5	8.5	70.8	29.6	32.8	35.9	5	6.5	5	6.5	70.8	103	115	127	5	12	12
2 FT	12	11	8	5	6.5	5	8.5	70.8	29.6	32.8	35.9	5	6	5	6	70.8	103	115	127	5	11.5	12
4 FT	8	10	9	5	6.5	6	7	67.9	26.1	29.0	31.9	5	6	5	6	72.5	102	114	126	5	11.5	0
6 FT	8	10	9	5	7	6	7	53.9	28.4	31.5	34.6	5	6	6	7	64.4	102	114	126	5	11	0
8 FT	8	10	9	5	6.5	6	6.5	49.1	28.4	31.5	34.6	5	6	6	6.5	55.0	102	114	126	5	10.5	0
10 FT	8	10	9	5	7	6	7	44.5	28.4	31.5	34.6	5	6.5	6	7	46.8	102	114	126	5	12	0
12 FT	9	10	9	5	6.5	5	6	41.0	29.8	33.0	36.1	6	8	6	6	45.6	102	114	126	5	11.5	0
14 FT	9	10	9	6	8	6	6.5	43.3	33.0	36.6	40.3	6	6.5	6	6	45.6	102	114	126	5	10.5	0
16 FT	10	11	9	6	7.5	6	7	43.3	30.3	33.5	36.8	6	6.5	6	6	45.6	103	115	127	5	9.5	0
18 FT	10	12	9	6	6.5	6	6	43.3	31.6	35.0	38.4	6	6.5	6	6	45.6	104	116	128	5	8.5	0
20 FT	11	13	9	6	6.5	6	6.5	43.3	31.0	34.3	37.5	6	6.5	G	6	45.6	105	117	129	5	8.5	0
22 FT	12	13	9	6	6	6	6.5	43.3	33.6	37.1	40.6	6	6	7	6.5	48.0	105	117	129	5	8.5	0
24 FT	13	14	10	6	6	6	7	43.6	33.0	36.4	39.8	6	6	6	6.5	44.9	106	118	130	5	8	0
26 FT	14	15	10	6	6	6	7	43.6	34.8	38.3	41.8	6	6	6	7	44.9	107	119	131	5	8	0
28 FT	14	16	11	7	8	6	7	44.0	35.1	38.6	42.0	7	8	5	6	42.9	108	120	132	5	7.5	0
30 FT	15	17	11	7	8	6	6.5	50.0	35.6	39.1	42.6	6	6	5	6	42.9	109	121	133	5	7.5	0
32 FT	16	18	12	6	6	6	7.5	50.4	36.3	39.8	43.3	6	6	5	6	43.3	110	122	134	5	7	0
34 FT	16	18	12	7	7.5	6	7	50.4	36.3	39.8	43.3	7	7.5	5	6	43.3	110	122	134	5	7	0
36 FT	17	19	13	7	7.5	6	7.5	50.9	38.1	41.8	45.3	7	7.5	5	6	43.5	111	123	135	5	7	0
38 FT	18	20	13	7	7.5	6	7.5	50.9	38.8	42.3	45.9	7	7.5	5	6	43.5	112	124	136	5	6.5	0
40 FT	18	20	13	7	7	6	7	50.9	38.8	42.3	45.9	7	7	6	8.5	46.0	112	124	136	5	6.5	0
42 FT	19	21	13	7	7	6	6.5	50.9	39.3	42.9	46.5	7	7	6	8	47.3	113	125	137	5	6.5	0
44 FT	19	21	14	7	6.5	6	6.5	51.3	39.3	42.9	46.5	7	7	5	6	43.9	113	125	137	5	6	0
46 FT	20	22	14	7	6.5	6	7	51.3	41.3	45.0	48.6	7	7	6	8.5	47.6	114	126	138	5	6	0
48 FT	20	22	14	7	6.5	6	6	51.3	45.3	49.3	53.4	7	6.5	6	7.5	47.6	114	126	138	5	6	0
50 FT	21	23	14	7	6.5	6	6	51.3	41.9	45.6	49.3	7	6.5	6	8	47.6	115	127	139	5	6	0

SPAN (S) = 9 FT HEIGHT (HT) = 11 FT OR 12 FT  MEMBER TOP SLAB BARS BOTTOM SLAB BARS WALL BARS																																
	М	EMBE	R			Τſ	OP SLA	AB BARS	5				WALL BARS																			
DESIGN	THI	CKNE	ESS	A1 BARS J3 BARS							A2	BARS			J4 BA	RS		B2 BARS														
FILL	TS	TS BS TX		TS BS TX		TS BS TX		TS BS TX		TS BS TX		TS BS TX		rs Bs Tx		SIZE	SPA.	SIZE	SPA.	C1	K2 HT=11'HT=12'		SIZE	SPA.	SIZE	SPA.	C4 HT=1		.3 HT=12	SIZE	SPA.	G1
1 FT	11	11	8	5	6	5	6	70.8	31.3	33.8	5	6	6	6	73.1	139	151	5	9.5	12												
2 FT	11	12	8	6	8.5	6	7	73.1	33.0	35.6	5	6	6	6	73.1	140	152	5	9.5	12												
4 FT	8	10	9	5	6	6	6.5	73.8	33.4	36.1	6	8	6	6	73.8	138	150	5	8.5	0												
6 FT	8	11	9	5	7	6	6.5	73.8	32.1	34.8	5	6	6	6	73.8	139	151	5	8.5	0												
8 FT	9	11	9	5	7	6	7	73.8	30.9	33.4	5	6	6	6	73.8	139	151	5	8.5	0												
10 FT	9	11	9	5	7.5	6	7	58.5	30.9	33.4	5	6.5	6	6	73.8	139	151	5	8.5	0												
12 FT	9	12	9	5	6.5	6	6	56.1	34.0	36.8	5	6	6	6	73.8	140	152	5	8.5	0												
14 FT	10	12	9	5	6	6	6	57.4	34.3	37.0	6	8	6	6	73.8	140	152	5	7.5	0												
16 FT	10	12	10	6	8	6	6.5	53.1	34.3	37.0	6	7	6	6	63.8	140	152	5	8	0												
18 FT	11	13	10	6	7.5	6	6.5	54.3	36.3	39.1	6	7	6	6	64.9	141	153	5	7.5	0												
20 FT	11	13	11	6	6.5	6	6.5	52.4	36.3	39.1	6	6.5	6	7	59.5	141	153	5	7.5	0												
22 FT	12	14	12	6	7	6	8	52.8	33.6	36.3	6	6.5	6	7.5	58.8	142	154	5	7	0												
24 FT	13	15	12	6	6.5	6	7.5	54.0	37.3	40.1	6	6.5	6	7	60.0	143	155	5	7	0												
26 FT	14	15	13	6	6.5	6	7.5	54.5	35.9	38.6	6	6	6	6.5	56.9	143	155	5	6.5	0												
28 FT	14	16	13	6	6	6	7	53.3	39.3	42.3	6	6	6	7	58.1	144	156	5	6.5	0												
30 FT	15	17	13	6	6	6	6.5	60.5	39.8	42.8	6	6	6	6.5	60.5	145	157	5	6.5	0												
32 FT	16	17	14	6	6	6	7	61.0	40.0	43.0	6	6	6	6	57.4	145	157	5	6	0												
34 FT	16	18	14	7	8	6	6.5	61.0	40.3	43.3	7	7.5	6	6.5	58.5	146	158	5	6	0												
36 FT	17	19	15	6	6	6	7	60.3	42.4	45.5	7	8	6	6.5	59.0	147	159	6	8	0												
38 FT	18	19	15	7	7.5	6	6.5	61.5	42.6	45.8	7	7.5	6	6.5	57.8	147	159	6	8	0												
40 FT	18	20	15	7	7.5	6	6	61.5	42.9	46.0	7	7.5	6	6.5	60.3	148	160	6	8	0												
42 FT	19	21	16	7	7.5	6	6.5	62.0	43.4	46.5	7	7.5	6	6.5	59.5	149	161	6	8	0												
44 FT	19	21	16	7	7	6	6	62.0	43.4	46.5	7	7	6	6.5	59.5	149	161	6	8	0												
46 FT	20	22	17	7	7	6	6.5	62.5	45.6	48.9	7	7	6	6.5	58.8	150	162	6	7.5	0												
48 FT	20	22	17	7	7	6	6	61.3	45.6	48.9	7	7	6	6.5	58.8	150	162	6	7.5	0												
50 FT	21	23	18	7	7	6	6.5	63.0	46.1	49.4	7	7	6	6.5	59.3	151	163	6	7	0												





# ALTERNATE J3 BAR

ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

## GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

CONCRETE

SPAN (S): 9 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 5 THRU 12 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

SHEET NO. 7 OF 14

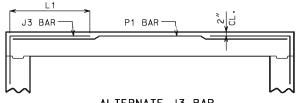
				SF	AN (	S)	= 10	FT		HE	IGHT	(H)	) =	5 F	T OR	6 FT	OR	7 FT				
		EMBE					TOP	SLAB E	BARS					[	BOTTO	/ SLAB	BARS			₩Al	_L BAF	₹S
DESIGN	TH:	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			Ba	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	K2 HT=6'	HT=7'	SIZE	SPA.	S I ZE	SPA.	C4	HT=5'	K3 HT=6'	HT=7'	S I ZE	SPA.	G1
1 FT	12	9	8	5	6	4	6	75.5	28.1	32.5	37.0	5	6	6	6.5	52.5	65	77	89	5	12	12
2 FT	12	10	8	5	6	5	7.5	76.8	32.4	37.4	42.4	5	6	5	6.5	44.8	66	78	90	5	12	12
4 FT	8	9	8	6	8	7	6.5	44.8	32.4	37.8	43.3	6	7.5	6	7	42.3	65	77	89	5	12	0
6 FT	8	10	8	6	8.5	6	6	42.3	28.5	33.1	37.9	6	7.5	5	6.5	35.9	66	78	90	5	12	0
8 FT	8	10	8	6	7.5	7	6	43.5	28.5	33.1	37.9	6	7	5	6.5	33.3	66	78	90	5	12	0
10 FT	9	10	8	6	7	6	6.5	38.4	29.6	34.4	39.3	6	6.5	6	7	35.9	66	78	90	5	12	0
12 FT	9	10	8	6	7.5	6	6.5	35.9	29.6	34.4	39.3	6	6.5	6	7	34.5	66	78	90	5	12	0
14 FT	9	11	8	6	6.5	7	6	39.6	29.3	33.9	38.6	6	6	5	7	29.5	67	79	91	5	12	0
16 FT	10	12	8	6	6	6	6	34.5	30.0	34.8	39.4	6	6	5	7.5	28.1	68	80	92	5	12	0
18 FT	11	13	8	7	7.5	6	6.5	33.3	31.6	36.4	41.3	7	7.5	5	8	28.1	69	81	93	5	12	0
20 FT	12	14	8	7	7.5	6	7	33.3	32.4	37.3	42.0	7	7.5	5	8.5	26.9	70	82	94	5	12	0
22 FT	13	15	8	7	7	6	7.5	32.0	33.3	38.0	42.8	7	7.5	5	8.5	26.9	71	83	95	5	12	0
24 FT	14	16	8	7	7	6	8	30.8	34.0	38.8	43.6	7	7.5	5	8	26.9	72	84	96	5	12	0
26 FT	15	17	8	7	6.5	6	8	37.1	35.6	40.6	45.5	7	7	5	7	26.9	73	85	97	5	12	0
28 FT	16	18	8	7	6.5	6	8.5	35.9	36.5	41.4	46.4	7	7	5	6.5	26.9	74	86	98	5	12	0
30 FT	17	18	8	7	6.5	5	6	32.0	37.8	42.9	47.9	7	6.5	5	6.5	26.9	74	86	98	5	11.5	0
32 FT	18	19	8	7	6.5	5	6	32.0	38.6	43.6	48.8	7	6.5	5	6.5	26.9	75	87	99	5	10	0
34 FT	18	20	8	7	6	6	7.5	35.9	38.1	43.0	48.0	7	6.5	5	6	26.9	76	88	100	5	9.5	0
36 FT	19	21	8	7	6	6	7.5	35.9	39.9	45.0	50.0	7	6.5	6	7.5	30.8	77	89	101	5	9.5	0
38 FT	20	21	8	7	6	6	7.5	35.9	44.1	49.6	55.3	7	6.5	6	7.5	30.8	77	89	101	5	9.5	0
40 FT	21	22	8	7	6	6	7	35.9	45.1	50.6	56.1	7	6.5	6	7	30.8	78	90	102	5	9	0
42 FT	21	23	9	8	7.5	5	6	33.5	41.6	46.6	51.6	7	6	5	6	28.4	79	91	103	5	8.5	0
44 FT	22	23	9	8	7.5	6	7.5	37.4	42.0	47.0	52.1	7	6	5	6	28.4	79	91	103	5	8.5	0
46 FT	23	24	10	8	7.5	5	6.5	33.8	43.9	49.0	54.1	7	6	5	6.5	28.6	80	92	104	5	8.5	0
48 FT	23	25	10	8	7	5	6	33.8	43.3	48.3	53.4	7	6	5	6	28.6	81	93	105	5	8	0
50 FT	24	25	10	8	7	5	6	33.8	44.8	49.9	55.0	7	6	5	6	28.6	81	93	105	5	8	0

				SPA	N (S	5) =	10	FT		HE:	I GHT	(HT)	= 1	1 F	T OR	12 F	T OR	13 F	T			$\neg$
	М	EMBE	R				TOP	SLAB I	BARS					E	BOTTO	SLAB	BARS			₩AI	L BAF	₹S
DESIGN	THI	CKN	SS	A1	BARS			J3	BARS			Α2	BARS			J4	BARS			Βí	2 BARS	ŝ
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	K2 HT=12'	HT=13'	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	K3 HT=12′	HT=13′	SIZE	SPA.	G1
1 FT	11	11	9	6	8	6	7.5	80.0	31.3	33.8	36.4	6	7.5	6	6	80.0	139	151	163	5	8.5	12
2 FT	11	11	9	6	7.5	6	7	80.0	35.8	38.6	41.5	6	7.5	6	6	80.0	139	151	163	5	8.5	12
4 FT	9	11	9	6	8	6	6.5	80.0	33.8	36.6	39.4	6	7.5	6	6	80.0	139	151	163	5	8	0
6 FT	9	12	9	5	6	6	6	80.0	31.1	33.6	36.1	6	7.5	6	6	80.0	140	152	164	5	7.5	0
8 FT	9	12	10	5	6	6	6.5	75.4	31.1	33.6	36.1	6	7.5	6	6.5	80.6	140	152	164	5	7.5	0
10 FT	10	12	10	6	8	6	6.5	74.1	32.8	35.4	38.0	6	7	6	6	80.6	140	152	164	5	7	0
12 FT	10	12	10	6	8.5	6	6.5	58.5	32.8	35.4	38.0	6	7.5	6	6	71.5	140	152	164	5	8	0
14 FT	10	13	10	6	7.5	6	6	57.3	31.5	34.0	36.5	6	7	6	6	74.1	141	153	165	5	7	0
16 FT	11	13	11	6	7	6	6.5	56.4	33.3	35.9	38.5	6	6.5	6	6.5	65.5	141	153	165	5	7.5	0
18 FT	12	14	12	6	7	6	7.5	56.8	33.6	36.3	39.0	6	6.5	6	7.5	63.4	142	154	166	5	7	0
20 FT	13	15	12	6	6.5	6	7	56.8	35.6	38.4	41.1	6	6	6	7	64.6	143	155	167	5	7	0
22 FT	13	15	13	6	6	6	7	55.9	35.6	38.4	41.1	7	8	6	7	61.1	143	155	167	5	6.5	0
24 FT	14	16	13	6	6	6	6.5	57.3	36.1	38.9	41.6	7	7.5	6	7	61.1	144	156	168	5	6.5	0
26 FT	15	17	13	7	8	6	6	63.9	36.6	39.4	42.1	7	7.5	6	6	62.5	145	157	169	5	6.5	0
28 FT	16	18	14	7	8	6	6.5	63.0	38.6	41.5	44.4	7	7.5	6	6.5	61.6	146	158	170	5	6	0
30 FT	16	18	14	7	7	6	6	63.0	40.3	43.3	46.3	7	7	6	6	61.6	146	158	170	5	6	0
32 FT	17	19	15	7	7	6	6	63.5	42.4	45.5	48.6	7	7	6	6	60.8	147	159	171	6	8	0
34 FT	18	20	15	7	7	6	6	63.5	42.9	46.0	49.1	7	7	6	6	62.1	148	160	172	6	8	0
36 FT	19	21	16	7	7	6	6	63.9	43.4	46.5	49.6	7	7	6	6	62.5	149	161	173	6	8	0
38 FT	19	21	16	7	6.5	7	7.5	69.4	43.4	46.5	49.6	7	6.5	6	6	61.3	149	161	173	6	8	0
40 FT	20	22	17	7	6.5	6	6	64.4	45.6	48.9	52.1	7	6.5	6	6	61.6	150	162	174	6	7.5	0
42 FT	21	23	17	7	6.5	7	7.5	69.9	46.1	49.4	52.6	7	6.5	6	6	63.0	151	163	175	6	7.5	0
44 FT	21	23	18	7	6.5	6	6	64.9	46.1	49.4	52.6	7	6.5	6	6	62.1	151	163	175	6	7	0
46 FT	22	24	19	7	6.5	6	6	65.4	46.8	50.0	53.3	7	6.5	6	6	62.5	152	164	176	6	6.5	0
48 FT	23	25	19	7	6	6	6	65.4	47.3	50.5	53.8	7	6	6	6	62.5	153	165	177	6	6.5	0
50 FT	23	25	20	7	6	6	6	65.8	47.3	50.5	53.8	7	6	6	6	63.0	153	165	177	6	6.5	0

_	C1
K2	ST
	A1 BAR 1½ CL. (TYP.)
	€ CULVERT B2 BAR →
₹	S XIX
	A2 BAR
<b>↓</b>	<b>□</b>
	J4 BAR

BAR DIMENSIONS DIAGRAM

SYMMETRICAL ABOUT & CULVERT.



#### ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY, ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

#### SPAN(S) = 10 FTHEIGHT (HT) = 8 FT OR 9 FT OR 10 FT TOP SLAB BARS BOTTOM SLAB BARS WALL BARS MEMBER THICKNESS A1 BARS B2 BARS J3 BARS A2 BARS J4 BARS TS | BS | TX |SIZE | SPA. |SIZE | SPA. | C 1 SIZE SPA. SIZE SPA. C4 SIZE SPA. G1 HT=8' HT=9' HT=10 HT=8' HT=9'HT=10 12 11 8 5 5 8 76.8 33.0 36.5 40.0 5 6 76.8 103 115 127 5 12 12 6 7.5 79.4 103 115 127 2 FT | 12 | 11 | 8 | 6 | 8 | 5 7 76.8 33.0 36.5 40.0 6 8 5 11.5 12 4 FT 8 10 9 6 8 6 6 59.4 28.4 31.5 34.6 6 7.5 6 7 68.4 102 114 126 6 FT 8 10 9 6 8 6 6 51.6 32.8 36.3 39.9 6 7.5 6 6.5 56.8 102 114 126 6 6 51.6 102 114 126 6 6.5 49.0 103 115 127 9 10 9 6 8 6 7 49.0 33.0 36.6 40.3 6 7 9 11 9 6 7.5 6 6 47.8 30.0 33.3 36.5 6 7 11 9 6 7.5 6 6 47.8 30.0 33.3 36.5 6 12 FT 9 11 9 6 7.5 6 6.5 43.9 30.0 33.3 36.5 6 7 6 6.5 43.9 103 115 127 5 12 0 14 FT 10 11 9 6 7 6 6.5 42.6 31.4 34.8 38.1 6 6 16 FT 10 12 9 6 6 6 42.6 30.5 33.8 37.0 7 8 18 FT 11 13 9 6 6 6 42.6 31.0 34.3 37.5 7 7.5 6 6 43.9 103 115 127 6 6.5 42.6 104 116 128 5 10.5 0 6 6.5 42.6 105 117 129 7 7.5 6 6.5 41.3 32.8 36.1 39.5 6 6.5 42.6 106 118 7.5 6 6.5 42.6 107 119 131 22 FT 13 15 9 7 7.5 6 6 41.3 33.4 36.6 40.0 7 7.5 24 FT | 14 | 16 | 10 | 7 | 7.5 | 6 | 7 | 41.6 | 35.1 | 38.6 | 42.0 | 7 | 7.5 | 6 | 8 | 42.9 | 108 | 120 | 132 | 5 | 8 | 0 48.5 35.6 39.1 42.6 5 6 40.6 109 121 28 FT 16 18 11 7 7 6 7 48.5 36.3 39.8 43.3 7 7.5 5 6 40.6 110 122 134 30 FT 17 19 12 7 7 6 7.5 48.9 38.1 41.8 45.3 7 7 5 6 40.9 111 123 135 32 FT 17 19 12 7 6.5 6 7 48.9 38.1 41.8 45.3 7 7 34 FT 18 20 12 7 6.5 6 7 48.9 38.8 42.3 45.9 7 6.5 5 6 40.9 111 6 8.5 43.5 112 124 136 6 8 43.5 113 125 137 36 FT 19 21 12 7 6.5 6 6 48.9 39.3 42.9 46.5 7 6.5 38 FT 19 21 13 7 6 6 6 49.3 39.3 42.9 46.5 7 6.5 6 8 43.9 113 125 137 40 FT 20 22 13 7 6 6 6.5 49.3 41.3 45.0 48.6 7 6.5 6 8 43.9 114 126 138 42 FT 21 23 13 7 6 6 6 49.3 41.9 45.6 49.3 7 6.5 44 FT 21 23 14 7 6 6 6 49.6 41.9 45.6 49.3 7 6 6 8 43.9 115 127 6 7.5 44.3 115 127 139 46 FT 22 24 14 7 6 6 6.5 49.6 42.5 46.3 49.9 7 6 6 8 45.5 116 128 48 FT 23 25 14 8 7.5 6 6.5 49.6 43.1 46.8 50.5 7 6 6 8 45.5 117 129 6 8 45.5 116 128 140 5 6 0 141 50 FT 23 25 14 8 7 6 6 49.6 43.1 46.8 50.5 7 6 6 7.5 45.5 117 129 141 5 6 0

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 10 FEET HE[GHT (HT): 5 THRU 13 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

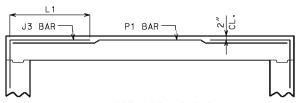
8 OF 14

				SF	AN (	S)	= 11	FT		HE	IGHT	(H)	) =	6 F	T OR	7 FT	OR	8 FT				
		EMBE					TOP	SLAB E	BARS					-	BOTTO	/ SLAB	BARS			₩AI	L BA	RS
DESIGN	TH:	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			B:	2 BAR:	S
FILL	TS	BS	ΤX	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	K2 HT=7'	HT=8'	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	K3 HT=7'	HT=8'	S I ZE	SPA.	G1
1 FT	12	10	8	6	7.5	5	7	82.6	32.0	36.4	40.6	6	8	6	7.5	61.6	78	90	102	5	12	12
2 FT	12	10	8	6	7.5	5	6.5	82.6	32.0	36.4	40.6	6	7.5	6	7	53.3	78	90	102	5	12	12
4 FT	9	10	8	6	7	6	6.5	46.3	29.3	33.4	37.4	6	7	6	7.5	46.3	78	90	102	5	12	0
6 FT	9	10	8	6	7	6	6.5	43.4	29.3	33.4	37.4	6	6.5	6	6.5	42.0	78	90	102	5	12	0
8 FT	9	10	8	6	6.5	6	6	42.0	33.5	38.3	42.9	6	6	6	6	40.6	78	90	102	5	12	0
10 FT	10	11	8	6	6.5	6	6.5	39.3	30.8	35.0	39.3	7	8	6	7	37.8	79	91	103	5	12	0
12 FT	10	11	8	6	6.5	6	6.5	37.8	30.8	35.0	39.3	6	6	6	7	35.0	79	91	103	5	12	0
14 FT	10	11	8	7	7.5	6	6	36.4	34.4	39.0	43.6	7	7	6	6	35.0	79	91	103	5	12	0
16 FT	11	13	8	7	7	6	6	36.4	31.9	36.0	40.3	7	7	5	6.5	30.8	81	93	105	5	12	0
18 FT	11	14	8	7	6	7	6	39.3	31.3	35.4	39.5	7	6.5	5	7	29.4	82	94	106	5	12	0
20 FT	13	15	8	7	6.5	6	6.5	33.6	33.3	37.5	41.6	7	6.5	5	7	29.4	83	95	107	5	12	0
22 FT	14	16	8	7	6	6	6.5	33.6	34.9	39.3	43.5	7	6.5	5	7	29.4	84	96	108	5	12	0
24 FT	15	17	8	7	6	6	6.5	39.3	35.6	40.0	44.3	7	6.5	5	6.5	29.4	85	97	109	5	12	0
26 FT	16	18	8	7	6	6	6.5	37.8	36.4	40.6	45.0	7	6.5	5	6.5	29.4	86	98	110	5	10	0
28 FT	17	19	8	8	7.5	6	6.5	37.8	37.1	41.4	45.8	7	6	5	6.5	29.4	87	99	111	5	9.5	0
30 FT	18	20	8	8	7.5	6	6	37.8	38.9	43.3	47.8	7	6	5	6	29.4	88	100	112	5	9.5	0
32 FT	19	21	9	8	7.5	6	7	39.5	39.6	44.0	48.5	7	6	5	6.5	29.6	89	101	113	5	9	0
34 FT	20	22	10	8	7.5	6	8	39.8	40.4	44.8	49.3	7	6	5	7	31.3	90	102	114	5	10	0
36 FT	21	23	10	8	7.5	6	8	39.8	41.1	45.5	50.0	7	6	5	6.5	31.3	91	103	115	5	9	0
38 FT	22	23	10	8	7	6	8	39.8	42.5	47.1	51.6	8	7.5	5	6.5	31.3	91	103	115	5	8	0
40 FT	22	24	11	8	7	6	7	40.0	43.0	47.5	52.0	8	7.5	5	7	31.5	92	104	116	5	9	0
42 FT	23	25	11	8	7	6	8	40.0	43.8	48.3	52.9	8	7.5	5	7	31.5	93	105	117	5	8.5	0
44 FT	24	26	11	8	7	6	8	40.0	44.5	49.0	53.6	8	7.5	5	6.5	31.5	94	106	118	5	7.5	0
46 FT	25	26	11	8	6.5	6	8	40.0	46.0	50.8	55.4	8	7	5	6.5	31.5	94	106	118	5	7.5	0
48 FT	25	27	11	8	6.5	6	7.5	40.0	45.3	49.8	54.4	8	7	5	6	31.5	95	107	119	5	7.5	0
50 FT	26	27	11	8	6.5	6	8	40.0	46.8	51.5	56.1	8	7	5	6	31.5	95	107	119	5	7.5	0

				SPA	N (S	5) =	: 11	FT		HE I	GHT	(HT)	= 1	2 F	T OR	13 F	T OR	14 F	T			$\neg$
	М	EMBE	R				TOP	SLAB	BARS					E	BOTTO	/ SLAB	BARS			₩AL	L BAF	₹S
DESIGN	THI	CKNE	ESS	A 1	BARS			J3	BARS			A2	BARS			J4	BARS			B2	2 BARS	ŝ
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1		K2		S I 7 F	SPA.	S I Z E	SPA.	C4		К3		SIZE	SPA.	G1
										HT=13'							_	HT=13				
1 FT	12	12	9	6	7.5	6	7	86.0	32.6	35.0	37.4	6	7.5	6	6	86.0	152	164	176	5	8.5	12
2 FT	12	12	9	6	(	6	6.5	86.0	34.3	36.8	39.3	6	(	6	6	86.0	152	164	176	5	8	12
4 FT	9	11	10	6	7	6	6	86.6	33.4	35.9	38.4	6	6.5	6	6	86.6	151	163	175	5	7.5	0
6 FT	9	12	10	6	7.5	6	6	86.6	33.6	36.1	38.6	6	6.5	6	6	88.0	152	164	176	5	7	0
8 FT	10	13	10	6	7.5	6	6	86.6	34.0	36.5	39.0	6	1	6	6	86.6	153	165	177	5	6.5	0
10 FT	10	13	11	6	7	6	6	70.1	34.0	36.5	39.0	6	6.5	6	6.5	88.6	153	165	177	5	6.5	0
12 FT	10	13	11	6	7.5	6	6	60.0	32.4	34.8	37.3	6	6.5	6	6.5	74.4	153	165	177	5	7.5	0
14 FT	11	13	11	6	6.5	6	6	60.0	35.9	38.5	41.1	6	6	6	6	70.1	153	165	177	5		0
16 FT	12	14	12	6	6.5	6	7	60.5	36.3	39.0	41.6	7	8	6	6.5	67.6	154	166	178	5	7	0
18 FT	13	15	13	6	6	6	7	59.5	38.4	41.1	43.9	7	7.5	6	7	65.3	155	167	179	5	6.5	0
20 FT	14	16	13	6	6	6	6.5	60.9	38.9	41.6	44.4	7	7.5	6	6.5	66.8	156	168	180	5	6.5	0
22 FT	14	17	14	7	7.5	6	6.5	59.9	39.1	41.9	44.6	7	7	6	6.5	64.3	157	169	181	5	6	0
24 FT	15	17	14	7	7	6	6	65.8	39.4	42.1	44.9	7	6.5	6	6	64.3	157	169	181	5	6	0
26 FT	16	18	15	7	7	6	6	66.1	41.5	44.4	47.3	7	6.5	6	6	63.3	158	170	182	6	8	0
28 FT	17	19	15	7	7	6	6	66.1	42.0	44.9	47.8	7	6.5	6	6	64.6	159	171	183	6	8	0
30 FT	18	20	16	7	7	6	6	66.6	42.5	45.4	48.3	7	6.5	6	6	63.6	160	172	184	6	8	0
32 FT	19	21	16	7	6.5	7	8	72.5	44.8	47.8	50.8	7	6.5	7	8	68.1	161	173	185	6	8	0
34 FT	20	22	16	7	6.5	7	7	72.5	45.3	48.3	51.3	7	6.5	7	7	68.1	162	174	186	6	8	0
36 FT	20	22	17	7	6	7	7.5	71.5	50.6	54.0	57.4	7	6	7	7	67.0	162	174	186	6	7.5	0
38 FT	21	23	18	7	6	7	7.5	72.0	45.8	48.8	51.8	7	6	7	7.5	67.5	163	175	187	6	7	0
40 FT	22	24	18	7	6	7	7	73.5	46.3	49.3	52.3	7	6	7	7.5	69.0	164	176	188	6	7	0
42 FT	23	25	19	7	6	7	7.5	74.0	48.6	51.8	54.9	7	6	7	8	68.0	165	177	189	6	6.5	0
44 FT	23	26	20	7	6	7	7.5	73.0	47.0	50.0	53.0	7	6	6	6	65.4	166	178	190	6	6.5	0
46 FT	24	26	20	8	7.5	7	7	73.0	49.1	52.3	55.4	8	7.5	7	7.5	68.4	166	178	190	6	6.5	0
48 FT	25	27	21	8	7.5	7	7.5	73.5	49.6	52.8	55.9	8	7.5	7	8	68.9	167	179	191	6	6	0
50 FT	25	27	21	8	7	7	7	73.5	49.6	52.8	55.9	8	7	7	7	68.9	167	179	191	6	6	0

_	J3 BAR	2" CL. (J3, B2)
K2		S)
	∐	1½" CL. (TYP.)
Ж З	€ CULVERT →	B2 BAR → TX
<u> </u>	A2 BAR	2" CL.
<b>↓</b> [		Sg)
	J4 BAR	1 3" CL. (J4. B2)

BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT & CULVERT.



#### ALTERNATE J3 BAR

ALIERNAIE J3 BAK

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

				SPA	N (S	5) =	: 11	FT		HE I	GHT	(HT)	= 9	FT	OR	10 FT	OR	11 FT	1			
	М	EMBE	R				TOP	SLAB E	BARS					E	зотто	V SLAB	BARS			WAL	L BAF	₹S
DESIGN		CKNE		Α1	BARS			J3	BARS			A2	BARS			J4	BARS			Bá	2 BARS	3
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1		K2	UT 441	SIZE	SPA.	SIZE	SPA.	C4		K3	h	SIZE	SPA.	G1
4 57	40	4.4	_		7 -	<u> </u>	_	00.6	HT=9'	HT=10'			7.5	_		05.4		HT=10'		_	0.5	40
1 FT	12	11	8	6	7.5	5		82.6	32.8	35.9	39.0	6	7.5	6	6.5	85.4	115	127	139	5	9.5	12
2 FT	12	11	8	6	7	5	6.5	82.6	32.8	35.9	39.0	6	7	6	6	85.4	115	127	139	5	9.5	12
4 FT	9	10	9	6	7	6	6.5	70.5	34.1	37.5	40.9	6	6.5	6	6	73.4	114	126	138	5	9.5	0
6 FT	9	11	9	6	7.5	6	6	57.8	30.8	33.8	36.8	6	6.5	6	6	64.9	115	127	139	5	9.5	0
8 FT	9	11	9	6	7	7	6.5	56.4	30.8	33.8	36.8	6	6	6	6	56.4	115	127	139	5	9	0
10 FT	10	12	9	6	6.5	6	6	50.8	31.3	34.3	37.3	6	6	6	6	55.0	116	128	140	5	8.5	0
12 FT	10	12	9	6	6.5	6	6	46.5	31.3	34.3	37.3	6	6	6	6	48.0	116	128	140	5	10	0
14 FT	11	12	9	6	6	6	6.5	45.1	35.3	38.6	42.0	7	7.5	6	6	46.5	116	128	140	5	9	0
16 FT	11	13	10	7	7.5	6	6	45.5	33.0	36.1	39.3	7	7	6	6.5	46.9	117	129	141	5	9.5	0
18 FT	12	14	10	7	7	6	6.5	45.5	32.3	35.3	38.3	7	7	6	6.5	45.5	118	130	142	5	8.5	0
20 FT	13	15	10	7	7	6	6	45.5	34.0	37.1	40.3	7	6.5	6	6.5	45.5	119	131	143	5	8	0
22 FT	14	16	11	7	7	6	6.5	45.8	35.9	39.1	42.4	7	6.5	6	7.5	45.8	120	132	144	5	8	0
24 FT	15	17	11	7	6.5	6	6	51.5	36.5	39.8	42.9	7	6.5	6	7.5	45.8	121	133	145	5	7.5	0
26 FT	16	18	12	7	6.5	6	6.5	51.9	37.0	40.3	43.5	7	6.5	6	8	46.1	122	134	146	5	7.5	0
28 FT	17	19	12	7	6.5	6	6.5	51.9	37.5	40.8	44.0	7	6.5	6	7.5	46.1	123	135	147	5	7	0
30 FT	18	20	13	7	6.5	6	6.5	52.3	38.1	41.3	44.5	7	6.5	6	8	46.4	124	136	148	5	7.5	0
32 FT	19	21	13	7	6	6	6.5	52.3	40.0	43.4	46.8	7	6	6	7.5	46.4	125	137	149	5	6.5	0
34 FT	20	22	13	7	6	6	6	52.3	40.6	44.0	47.4	7	6	6	7.5	46.4	126	138	150	5	6.5	0
36 FT	21	22	13	7	6	6	6	52.3	45.3	49.0	52.8	7	6	6	6.5	46.4	126	138	150	5	6.5	0
38 FT	21	23	14	8	7.5	6	6	52.5	41.1	44.5	47.9	7	6	6	7.5	46.8	127	139	151	5	6	0
40 FT	22	24	14	8	7.5	6	6	52.5	43.3	46.8	50.1	8	7.5	6	7	48.1	128	140	152	5	6	0
42 FT	23	25	15	8	7.5	6	6.5	52.9	48.4	52.1	56.0	8	7.5	6	7.5	48.5	129	141	153	5	6	0
44 FT	24	25	15	8	7	6	6.5	52.9	48.6	52.5	56.4	8	7	6	6.5	48.5	129	141	153	6	8	0
46 FT	24	26	15	8	7	6	6	52.9	49.0	52.8	56.6	8	7	6	7	48.5	130	142	154	6	8	0
48 FT	25	27	16	8	7	6	6	53.3	49.6	53.5	57.3	8	7	6	7.5	48.9	131	143	155	6	8	0
50 FT	26	27	16	8	6.5	6	6	53.3	51.5	55.5	59.4	8	7	6	6.5	48.9	131	143	155	6	8	0

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 11 FEET HEIGHT (HT): 6 THRU 14 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

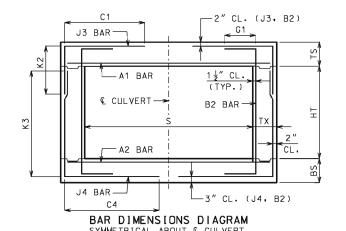
SHEET NO. 9 OF 14

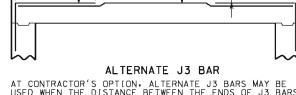
				SP	AN (	S)	= 12	FT		HE	IGHT	(HT	) =	6 F	T OR	7 FT	OR	8 FT				
		EMBE					TOP	SLAB E	BARS					E	BOTTO	/ SLAB	BARS			₩Al	L BAF	₹S
DESIGN	TH)	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			Ba	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	K2 HT=7'	HT=8'	SIZE	SPA.	S I ZE	SPA.	C4	HT=6'	K3 HT=7'	HT=8'	S I ZE	SPA.	G1
1 FT	13	10	8	6	7.5	5	8.5	89.6	33.3	37.8	42.1	6	7.5	6	6.5	57.8	78	90	102	5	12	12
2 FT	14	10	8	6	7	5	8.5	89.6	34.6	39.1	43.8	6	7	6	6	51.6	78	90	102	5	12	12
4 FT	10	11	8	6	6.5	6	6.5	47.1	30.8	35.0	39.3	6	6.5	5	6.5	42.5	79	91	103	5	12	0
6 FT	10	11	8	6	6.5	6	6.5	44.1	30.8	35.0	39.3	6	6	5	6	39.5	79	91	103	5	12	0
8 FT	10	11	8	6	6	6	6.5	41.0	30.8	35.0	39.3	7	7.5	6	6.5	39.5	79	91	103	5	12	0
10 FT	10	11	8	7	7	7	6	42.5	34.4	39.0	43.6	7	6.5	6	6	38.0	79	91	103	5	12	0
12 FT	11	12	8	7	7	6	6	38.0	35.1	39.8	44.5	7	6.5	6	6.5	36.5	80	92	104	5	12	0
14 FT	11	13	8	7	7	6	6	36.5	31.9	36.0	40.3	7	6.5	5	7	30.4	81	93	105	5	12	0
16 FT	12	14	8	7	6.5	6	6	35.0	32.5	36.8	41.0	7	6.5	5	7	30.4	82	94	106	5	12	0
18 FT	13	15	8	7	6	6	6.5	33.5	33.3	37.5	41.6	7	6	5	6.5	30.4	83	95	107	5	12	0
20 FT	15	17	8	7	6	6	7	39.5	35.6	40.0	44.3	7	6.5	5	7	30.4	85	97	109	5	12	0
22 FT	16	18	8	7	6	6	7	39.5	36.4	40.6	45.0	7	6	5	6.5	30.4	86	98	110	5	12	0
24 FT	17	19	8	8	7.5	6	7	39.5	37.1	41.4	45.8	7	6	5	6.5	30.4	87	99	111	5	11	0
26 FT	18	20	8	8	7	6	7	39.5	38.9	43.3	47.8	7	6	5	6	30.4	88	100	112	5	9.5	0
28 FT	19	21	8	8	7	6	7	39.5	39.6	44.0	48.5	7	6	6	7.5	33.5	89	101	113	5	9.5	0
30 FT	20	21	8	8	7	6	6.5	39.5	44.3	49.3	54.1	8	7	6	7.5	33.5	89	101	113	5	9.5	0
32 FT	21	23	g,	8	7	6	7.5	39.8	41.1	45.5	50.0	8	7.5	5	6	30.6	91	103	115	5	8.5	0
34 FT	22	23	9	8	6.5	6	7.5	39.8	42.5	47.1	51.6	8	7	5	6	30.6	91	103	115	5	8.5	0
36 FT	23	24	9	8	6.5	6	7	39.8	47.9	52.9	58.0	8	7	6	7	33.6	92	104	116	5	8.5	0
38 FT	24	25	9	8	6.5	6	6.5	39.8	48.8	53.8	58.8	8	7	6	7	33.6	93	105	117	5	8.5	0
40 FT	24	26	10	8	6	6	7	40.0	44.5	49.0	53.6	8	7	5	6	30.8	94	106	118	5	8	0
42 FT	25	27	10	8	6	6	7	40.0	45.3	49.8	54.4	8	7	6	7	33.9	95	107	119	5	8	0
44 FT	26	27	10	8	6	6	7	40.0	50.4	55.5	60.5	8	6.5	6	7	33.9	95	107	119	5	8	0
46 FT	27	28	10	8	6	6	7	40.0	51.3	56.3	61.4	8	6.5	6	7	33.9	96	108	120	5	7.5	0
48 FT	28	29	11	8	6	6	7.5	40.3	52.1	57.1	62.1	8	6.5	6	7.5	34.1	97	109	121	5	7.5	0
50 FT	28	30	11	8	6	6	7.5	40.3	52.5	57.5	62.6	8	6.5	6	7	34.1	98	110	122	5	7.5	0

				SPAN	V (S	) =	12 F	Т		HEI	GHT	(HT	) =	12 F	T OR	13 F	T			
		EMBE				ΤC	OP SLA	AB BAR	S				BOT:	TOM SI	AB BA	RS		₩Al	_L BAF	₹S
DESIGN	TH:	CKNE	ESS	A1	BARS			J3 BA	RS		A2	BARS			J4 BA	RS		B2	2 BARS	5
FILL	TS	BS	ТХ	SIZE	SPA.	S I ZE	SPA.	C1	HT=12'		SIZE	SPA.	SIZE	SPA.	C4	K HT=12'		SIZE	SPA.	G1
1 FT	12	11	9	6	6.5	5	6	90.3	32.4	34.8	6	6.5	6	6	91.8	151	163	5	8.5	12
2 FT	12	11	9	6	6.5	6	7	91.8	34.0	36.5	6	6.5	6	6	91.8	151	163	5	8.5	12
4 FT	10	12	9	6	6.5	6	6	91.8	35.4	38.0	6	6.5	6	6	91.8	152	164	5	8.5	0
6 FT	10	12	9	6	6.5	7	6.5	81.1	35.4	38.0	6	6	6	6	91.8	152	164	5	8	0
8 FT	10	12	10	6	6.5	6	6	64.6	35.4	38.0	7	7.5	6	6	73.9	152	164	5	8	0
10 FT	11	13	10	6	6	6	6	61.6	35.9	38.5	7	7.5	6	6	69.3	153	165	5	8	0
12 FT	12	13	11	6	6	6	7	58.9	36.1	38.8	7	7	6	6	62.0	153	165	5	7.5	0
14 FT	12	13	11	6	6	6	7	54.3	36.1	38.8	7	7	6	6	55.8	153	165	5	7.5	0
16 FT	12	14	11	7	7	6	6	52.8	36.3	39.0	7	6.5	6	6.5	55.8	154	166	5	7.5	0
18 FT	13	16	12	7	7	6	6	53.0	38.6	41.4	7	6.5	6	7	56.1	156	168	5	7	0
20 FT	14	16	12	7	6.5	6	6	53.0	38.9	41.6	7	6	6	6	54.6	156	168	5	7	0
22 FT	16	18	13	7	6.5	6	6	59.6	41.5	44.4	7	6.5	6	7	55.0	158	170	5	6.5	0
24 FT	16	19	13	7	6	7	7	64.4	40.0	42.8	7	6	6	6.5	55.0	159	171	5	6.5	0
26 FT	18	20	14	7	6.5	6	6	58.5	42.5	45.4	7	6	6	6.5	55.3	160	172	5	6	0
28 FT	18	21	14	7	6	7	7	63.3	42.8	45.6	7	6	6	6.5	55.3	161	173	5	6	0
30 FT	19	22	14	8	7.5	7	6.5	63.3	43.3	46.1	7	6	6	6	55.3	162	174	5	6	0
32 FT	20	23	15	8	7.5	7	7.5	63.6	45.5	48.5	8	7.5	6	6.5	55.6	163	175	6	8	0
34 FT	21	23	15	8	7	7	7	63.6	45.8	48.8	8	7	6	6	55.6	163	175	6	8	0
36 FT	22	24	16	8	7	7	7.5	64.0	46.3	49.3	8	7	6	6.5	56.0	164	176	6	8	0
38 FT	23	25	16	8	7	7	7	64.0	48.6	51.8	8	7	6	6	56.0	165	177	6	8	0
40 FT	24	26	17	8	7	7	7.5	64.4	49.1	52.3	8	7	6	6.5	56.4	166	178	6	7.5	0
42 FT	24	27	17	8	6.5	7	6.5	64.4	49.4	52.5	8	7	6	6	56.4	167	179	6	7.5	0
44 FT	25	28	18	8	6.5	7	7	66.4	49.9	53.0	8	7	6	6.5	56.8	168	180	6	7	0
46 FT	26	28	18	8	6.5	7	7	66.4	50.1	53.3	8	6.5	6	6	56.8	168	180	6	7	0
48 FT	27	29	19	8	6.5	7	7.5	66.9	52.6	55.9	8	6.5	6	6.5	57.0	169	181	6	6.5	0
50 FT	28	30	19	8	6.5	7	7	66.9	53.3	56.4	8	6.5	6	6	57.0	170	182	6	6.5	0

				SPA	N (S	5) =	12			HE:	GHT	(HT)	= 9			10 FT	<u> </u>	11 FT				
		EMBE					TOP	SLAB E							BOTTO	M SLAB					L BAI	
DESIGN	TH)	CKNE	SS	A1	BARS			J3	BARS			A2	BARS			J4	BARS			B2	BAR:	ŝ
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=9'	K2 HT=10'	HT=11'	SIZE	SPA.	SIZE	SPA.	C4	HT=9'	K3 HT=10	HT=11	SIZE	SPA.	G1
1 FT	11	12	8	6	6.5	6	7	91.3	31.5	34.5	37.5	6	7.5	6	7	91.3	116	128	140	5	10	12
2 FT	11	12	8	6	6	6	6.5	91.3	31.5	34.5	37.5	6	7	6	6.5	91.3	116	128	140	5	9.5	12
4 FT	10	12	8	6	6	6	6	69.9	30.0	32.9	35.8	6	6.5	6	6.5	83.6	116	128	140	5	9.5	0
6 FT	10	12	8	6	6.5	6	6	57.8	31.3	34.3	37.3	6	6	6	6	62.4	116	128	140	5	9.5	0
8 FT	10 12 9 6 6 6 6 52.0 31.3 34.											7	8	6	6	55.1	116	128	140	5	10	0
10 FT	10	12	9	7	7.5	7	6	52.0	35.0	38.4	41.8	7	7	6	6	50.5	116	128	140	5	9.5	0
12 FT	11	13	10	7	7.5	6	6	49.3	33.0	36.1	39.3	7	7	6	6.5	49.3	117	129	141	5	10	0
14 FT	11	13	10	7	7.5	6	6	46.3	31.8	34.8	37.8	7	7	6	6.5	46.3	117	129	141	5	12	0
16 FT	12	14	10	7	7	6	6.5	46.3	32.3	35.3	38.3	7	6.5	6	7	44.6	118	130	142	5	11	0
18 FT	13	15	10	7	6.5	6	6	44.6	38.0	41.5	45.0	7	6	6	7	44.6	119	131	143	5	9.5	0
20 FT	14	16	10	7	6	7	7.5	47.8	38.6	42.0	45.5	7	6	6	6.5	44.6	120	132	144	5	8.5	0
22 FT	16	18	11	7	6.5	6	6.5	51.1	37.0	40.3	43.5	7	6.5	6	7.5	45.0	122	134	146	5	8.5	0
24 FT	17	19	11	7	6	6	6	49.6	37.5	40.8	44.0	7	6	6	7.5	45.0	123	135	147	5	7.5	0
26 FT	18	20	12	7	6	6	6.5	49.9	38.1	41.3	44.5	7	6	6	7.5	45.3	124	136	148	5	8	0
28 FT	19	21	12	7	6	6	6	49.9	40.0	43.4	46.8	7	6	6	7.5	45.3	125	137	149	5	7	0
30 FT	20	22	13	8	7.5	6	6.5	51.8	40.6	44.0	47.4	7	6	6	8	45.5	126	138	150	5	7.5	0
32 FT	21	23	13	8	7.5	6	6	50.3	41.1	44.5	47.9	8	7.5	6	7.5	45.5	127	139	151	5	7	0
34 FT	21	23	13	8	7	6	6	50.3	45.6	49.3	53.0	8	7	6	7	45.5	127	139	151	5	6.5	0
36 FT	22	24	14	8	7	6	6	52.1	43.3	46.8	50.1	8	7	6	7.5	45.9	128	140	152	5	7	0
38 FT	23	25	14	8	6.5	6	6	50.5	43.8	47.3	50.8	8	7	6	7.5	45.9	129	141	153	5	6	0
40 FT	24	26	14	8	6.5	6	6	50.5	44.4	47.9	51.4	8	7	6	7	45.9	130	142	154	5	6	0
42 FT	25	27	15	8	6.5	6	6	52.5	49.6	53.5	57.3	8	7	6	7.5	46.1	131	143	155	5	6	0
44 FT	26	28	15	8	6.5	6	6	52.5	50.3	54.1	57.9	8	6.5	6	7.5	47.8	132	144	156	6	8	0
46 FT	27	28	15	8	6.5	6	6	50.9	52.1	56.1	60.0	8	6.5	6	7	47.8	132	144	156	6	8	0
48 FT	27	29	15	8	6	6	6	52.5	52.5	56.4	60.4	8	6.5	6	7	47.8	133	145	157	6	8	0
50 FT	28	30	16	8	6	6	6	52.8	53.1	57.1	61.0	8	6.5	6	7.5	48.0	134	146	158	6	8	0
				CDA	1 (	١	13 5	т		UE 1	CUT /	IIT 1	_ 4	4 []	. 00	15 5	г			¬ ¯		
		EMRE		SPAI	<b>V</b> (S		12 F	AR RARG		HEI	JHI L	HT)	= 1		OR AR RA	15 F	<u> </u>	WΔII	BARS	4		

				SPAN	<b>1</b> (S	) =	12 F	Т		HEI	GHT	(HT	) =	14 F	T OR	15 F	Т			
		EMBE				TO	OP SLA	AB BAR	5				BOT	TOM SI	_AB BA	RS		₩Al	L BA	RS
DESIGN	TH!	CKNE	SS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BA	RS		B2	2 BAR	S
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K HT=14'		SIZE	SPA.	SIZE	SPA.	C4	K HT=14	3 HT=15	SIZE	SPA.	G1
1 FT	12	12	10	6	7	6	7.5	94.0	35.5	37.8	6	7	6	6.5	94.0	176	188	5	7.5	12
2 FT	12	12	10	6	6.5	6	7	94.0	37.4	39.8	6	6.5	6	6	94.0	176	188	5	7.5	12
4 FT	10	13	10	6	6.5	6	6	94.0	35.4	37.6	6	6.5	6	6	94.0	177	189	5	6.5	0
6 FT	10	13	11	6	7	6	6.5	94.5	35.4	37.6	6	6.5	6	6.5	94.5	177	189	5	6.5	0
8 FT	10	13	11	6	6.5	6	6	85.3	35.4	37.6	6	6	6	6	94.5	177	189	5	6	0
10 FT	11	13	12	6	6.5	6	6.5	74.9	35.5	37.8	7	7.5	6	6	95.1	177	189	5	6	0
12 FT	12	14	13	6	6.5	6	7	70.6	37.8	40.3	7	7.5	6	6.5	83.3	178	190	5	6	0
14 FT	12	14	13	6	6.5	6	7	62.8	37.8	40.3	7	7.5	6	6.5	69.1	178	190	5	6.5	0
16 FT	13	15	13	6	6	6	6.5	64.4	38.3	40.6	7	7	6	6.5	70.6	179	191	5	6.5	0
18 FT	14	16	14	7	7.5	6	6.5	63.3	38.6	41.0	7	7	6	6.5	68.0	180	192	5	6	0
20 FT	15	17	14	7	7	6	6	69.5	39.0	41.4	7	6.5	6	6	68.0	181	193	5	6	0
22 FT	16	18	15	7	7	6	6	70.0	41.4	43.9	7	6.5	6	6.5	68.4	182	194	6	8	0
24 FT	16	19	15	7	6.5	7	7	73.1	41.6	44.1	7	6	6	6	68.4	183	195	6	8	0
26 FT	17	20	16	7	6.5	7	7	73.6	42.0	44.5	7	6	6	6	67.3	184	196	6	8	0
28 FT	18	21	16	7	6	7	7	75.3	46.5	49.3	7	6	7	7.5	72.0	185	197	6	8	0
30 FT	19	22	17	7	6	7	7	74.0	46.9	49.6	7	6	7	7.5	70.9	186	198	6	7.5	0
32 FT	20	23	17	7	6	7	6.5	75.6	47.4	50.1	7	6	7	7	70.9	187	199	6	7.5	0
34 FT	21	23	18	8	7.5	7	7	74.5	51.8	54.8	8	7.5	7	6.5	71.3	187	199	6	7	0
36 FT	22	24	19	8	7.5	7	7.5	75.0	52.3	55.3	8	7.5	7	7	70.1	188	200	6	6.5	0
38 FT	23	25	19	8	7.5	7	6.5	76.6	50.6	53.5	8	7	7	7	71.8	189	201	6	6.5	0
40 FT	24	26	20	8	7	7	7	75.5	51.1	54.0	8	7	7	7.5	70.5	190	202	6	6.5	0
42 FT	25	27	20	8	7	7	6.5	77.1	53.8	56.8	8	7	7	7	72.1	191	203	6	6.5	0
44 FT	25	28	21	8	7	7	6.5	75.9	54.0	57.0	8	7	7	7.5	72.6	192	204	6	6	0
46 FT	26	28	22	8	6.5	7	7	76.4	56.4	59.5	8	6.5	7	7	71.4	192	204	6	6	0
48 FT	27	29	22	8	6.5	7	6.5	76.4	59.1	62.4	8	6.5	7	6.5	71.4	193	205	6	6	0
50 FT	27	30	23	8	6.5	7	6.5	76.9	57.3	60.4	8	6.5	7	7	71.8	194	206	7	7.5	0





P1 BAR

L1

J3 BAR -

ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS, NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## SINGLE BOX CULVERT MEMBER THICKNESS

CONCRETE

BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 12 FEET HE[GHT (HT): 6 THRU 15 FEET

04/01/2011 DATE PREPARED:

703.17

10 OF 14

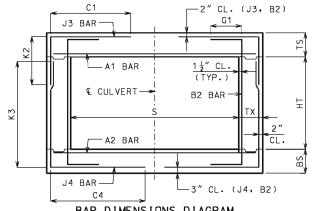
DATE EFFECTIVE:

				SP	AN (	S)	= 13	FT		HE	IGHT	(HT	) =	7 F	T OR	8 FT	OR 9	9 FT				
		EMBE					TOP	SLAB E	BARS					E	BOTTO	/ SLAB	BARS			₩AI	_L BAF	₹S
DESIGN	THI	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			B:	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=7′	K2 HT=8'	HT=9'	SIZE	SPA.	S I ZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	S I ZE	SPA.	G1
1 FT	13	11	8	6	6.5	5	8.5	95.1	34.0	38.0	41.9	6	7	6	7	67.3	91	103	115	5	12	12
2 FT	13	11	8	6	6	5	6.5	95.1	34.0	38.0	41.9	6	6.5	6	6.5	59.0	91	103	115	5	12	12
4 FT	10	11	8	7	7.5	6	6	49.3	31.0	34.8	38.5	6	6	6	6.5	49.3	91	103	115	5	12	0
6 FT	10	11	8	7	7.5	6	6	45.9	34.0	38.1	42.1	7	7	6	6	45.9	91	103	115	5	12	0
8 FT	10	12	8	7	7	7	6	47.5	30.3	33.9	37.5	7	7	6	7	42.6	92	104	116	5	12	0
10 FT	11	12	8	7	6.5	7	6.5	44.3	35.8	39.9	44.1	7	6	6	6	41.0	92	104	116	5	12	0
12 FT	12	13	8	7	6	7	6.5	42.6	36.4	40.6	44.8	7	6	6	6.5	39.4	93	105	117	5	12	0
14 FT	12	14	8	7	6	7	6.5	41.0	32.5	36.3	40.0	7	6	5	6	32.8	94	106	118	5	12	0
16 FT	13	15	8	8	7.5	7	6.5	39.4	33.1	36.9	40.6	7	6	5	6	31.1	95	107	119	5	12	0
18 FT	14	16	8	8	7	7	7	37.8	34.9	38.8	42.5	8	7.5	6	8	34.5	96	108	120	5	12	0
20 FT	15	18	8	8	6.5	7	7	45.9	35.9	39.6	43.5	8	7.5	5	6	31.1	98	110	122	5	11.5	0
22 FT	17	19	8	8	7	6	6	41.0	38.0	41.9	45.9	8	7.5	6	8	34.5	99	111	123	5	9.5	0
24 FT	18	20	8	8	6.5	7	7.5	45.9	38.6	42.6	46.5	8	7	6	7.5	34.5	100	112	124	5	9.5	0
26 FT	19	21	9	8	6.5	6	6	41.3	39.3	43.3	47.3	8	7	5	6	31.4	101	113	125	5	9	0
28 FT	20	22	10	8	6.5	6	6.5	41.5	41.1	45.3	49.3	8	7	5	6	33.3	102	114	126	5	10	0
30 FT	21	23	10	8	6.5	6	6.5	41.5	41.9	45.9	50.0	8	6.5	5	6	33.3	103	115	127	5	9	0
32 FT	22	24	10	8	6	6	6	41.5	42.5	46.6	50.6	8	6.5	5	6	33.3	104	116	128	5	8	0
34 FT	23	25	11	8	6	6	6.5	41.8	43.1	47.3	51.4	8	6.5	5	6.5	33.4	105	117	129	5	8.5	0
36 FT	24	26	11	8	6	6	6.5	41.8	45.1	49.4	53.5	8	6.5	5	6	33.4	106	118	130	5	8	0
38 FT	25	27	12	8	6	6	6.5	42.0	45.9	50.0	54.3	8	6.5	5	6	33.6	107	119	131	5	8.5	0
40 FT	26	28	12	8	6	6	7	42.0	46.5	50.8	55.0	8	6.5	5	6	33.6	108	120	132	5	7.5	0
42 FT	27	29	12	9	7.5	6	7	42.0	51.3	55.9	60.4	8	6	6	8.5	37.0	109	121	133	5	7	0
44 FT	28	30	12	9	7	6	7	42.0	52.0	56.6	61.1	8	6	6	8	37.0	110	122	134	5	7	0
46 FT	29	30	12	9	7	6	7	42.0	53.9	58.5	63.1	8	6	6	7.5	37.0	110	122	134	5	7	0
48 FT	30	31	12	9	7	6	7	42.0	54.6	59.3	64.0	8	6	6	7.5	37.0	111	123	135	5	7	0
50 FT	30	32	12	9	7	6	6.5	42.0	55.0	59.6	64.4	8	6	6	7.5	37.0	112	124	136	5	7	0

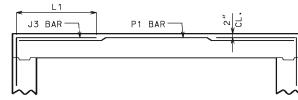
				SPAN	<b>1</b> (S	) =	13 F	Т		HEI	GHT	(HT	) =	13 F	T OR	14 F	Т			
		EMBE				TC	DP SLA	AB BAR					вот	TOM SL				₩Al		
DESIGN	THI	CKN	ESS	A1	BARS			J3 BA			A2	BARS			J4 BA	_		B	2 BARS	5
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=13'		SIZE	SPA.	SIZE	SPA.	C4	K HT=13'		SIZE	SPA.	G1
1 FT	12	12	9	6	6	6	6.5	99.0	36.8	39.3	6	6.5	6	6	99.0	164	176	5	8.5	12
2 FT	12	12	9	7	8	6	6.5	99.0	36.8	39.3	6	6	6	6	99.0	164	176	5	8	12
4 FT	10	12	10	6	6	6	6	99.6	34.6	37.0	7	8	6	6	99.6	164	176	5	8	0
6 FT	11	13	10	6	6	6	6.5	84.6	35.0	37.4	6	6	6	6.5	99.6	165	177	5	7.5	0
8 FT	11	13	10	6	6	7	6.5	74.8	35.0	37.4	7	7	6	6	84.6	165	177	5	7	0
10 FT	11	13	11	7	7.5	7	6.5	68.5	35.0	37.4	7	6.5	6	6	70.1	165	177	5	7.5	0
12 FT	12	14	12	7	7	6	6.5	62.1	37.1	39.8	7	6.5	6	6.5	67.3	166	178	5	7	0
14 FT	13	15	12	7	7	6	6	62.1	37.6	40.1	7	6	6	6	65.5	167	179	5	7	0
16 FT	13	15	12	7	6.5	7	7	60.5	37.6	40.1	7	6	6	6.5	58.8	167	179	5	7	0
18 FT	14	17	13	7	6.5	7	8	59.1	38.3	40.8	7	6	6	6.5	59.1	169	181	5	6.5	0
20 FT	15	18	13	7	6	7	7	67.6	40.5	43.1	7	6	6	6	59.1	170	182	5	6.5	0
22 FT	17	19	14	7	6	7	7.5	68.0	41.1	43.8	7	6	6	6	59.5	171	183	5	6	0
24 FT	18	20	14	7	6	7	7.5	66.3	43.5	46.3	8	7.5	6	6	59.5	172	184	5	6	0
26 FT	19	21	15	8	7.5	7	7.5	66.8	43.9	46.8	8	7	6	6	58.1	173	185	6	8	0
28 FT	20	22	15	8	7	7	7	66.8	44.4	47.1	8	7	6	6	58.1	174	186	6	8	0
30 FT	21	23	16	8	7	7	7	67.1	46.8	49.6	8	7	6	6	58.5	175	187	6	8	0
32 FT	22	24	16	8	7	7	7	67.1	49.3	52.3	8	7	7	7.5	61.9	176	188	6	8	0
34 FT	23	25	17	8	6.5	7	7	67.5	47.8	50.6	8	6.5	6	6	58.9	177	189	6	7.5	0
36 FT	24	26	17	8	6.5	7	6.5	67.5	52.3	55.4	8	6.5	7	7.5	62.3	178	190	6	7.5	0
38 FT	25	27	18	8	6.5	7	7	67.9	50.8	53.8	8	6.5	6	6	59.1	179	191	6	7	0
40 FT	25	28	18	8	6	7	6	67.9	51.0	54.0	8	6.5	6	6	59.1	180	192	6	7	0
42 FT	26	29	19	8	6	7	6.5	68.3	51.5	54.5	8	6.5	6	6	59.5	181	193	6	6.5	0
44 FT	27	30	19	8	6	7	6	68.3	52.0	55.0	8	6	6	6	59.5	182	194	6	6.5	0
46 FT	28	31	20	8	6	7	6.5	68.6	52.5	55.5	8	6	6	6	59.9	183	195	6	6.5	0
48 FT	29	31	20	8	6	7	6	68.6	57.0	60.3	8	6	7	7.5	63.4	183	195	6	6.5	0
50 FT	30	32	21	9	7.5	7	7	69.0	55.4	58.5	8	6	6	6	60.1	184	196	6	6	0

THI CRNESS   A1 BARS   J3 BARS   A2 BARS   J4 BARS   E			
FILL  TS BS TX SIZE SPA. SIZE SPA.  C1   HT=10   HT=11   HT=12   SIZE SPA. SIZE SPA.  L1 FT 12 12 9 6 6.5 5 6 95.8 33.4 36.3 39.1 6 7 6 6.5 6 7 99.0 129 141 153 5  4 FT 10 11 9 7 7.5 6 6 6 72.6 34.0 37.0 40.0 7 7.5 6 6 6 77.5 127 139 151 5  8 FT 10 11 10 6 6 6 6 6 61.4 34.0 37.0 40.0 7 7.5 6 6 6.5 59.8 128 140 152 5  8 FT 10 12 10 7 7.5 7 6 59.8 34.3 37.3 40.3 7 7 7 6 6.5 59.8 128 140 153 5  12 FT 12 14 10 7 6.5 6 6 51.5 33.9 36.8 39.6 7 6.5 6 6.5 59.8 128 140 153 5  14 FT 12 14 10 7 6.5 6 6 6 48.1 33.9 36.8 39.6 7 6.5 6 6 6 33.1 130 142 154 5  16 FT 13 15 10 7 6 7 7 51.5 34.4 37.3 40.1 7 6 6 6 48.1 130 142 154 5  18 FT 14 16 11 7 6 7 7.5 51.8 39.1 42.4 45.6 8 7.5 6 6 6 48.1 131 143 155 5  18 FT 14 16 11 7 8 7 7 7 8 59.5 46.8 39.8 42.9 46.0 8 7 6 7 48.8 135 147 159 5  28 FT 19 21 13 8 7 7 8 59.1 40.3 43.4 46.5 8 7 6 7 49.0 138 150 152 5  30 FT 21 23 14 8 7 7 7.5 59.9 40.5 46.8 50.1 53.6 8 6.5 6 6.5 49.9 146 158 157 169 6  44 FT 28 30 16 8 6 7 7.5 59.9 50.8 54.3 57.9 8 6.5 6 6.5 49.9 146 158 157 169 6  44 FT 28 30 16 8 6 7 7.5 50.3 51.8 51.9 53.1 53.4 59.9 140.1 55.5 6 6 6.5 49.9 146 158 157 169 6  44 FT 28 30 16 8 6 7 7.5 59.9 50.8 54.3 57.9 8 6.5 6 6.5 49.9 146 158 157 169 6	ALL BAR	BAR	RS
TS	32 BARS	BARS	S
2 FT 12 13 9 6 6 6 7 99.0 32.3 35.0 37.8 6 6.5 6 7 99.0 129 141 153 5 4 FT 10 11 9 7 7.5 6 6 6 72.6 34.0 37.0 40.0 7 7.5 6 6 6 77.5 127 139 151 5 6 FT 10 11 10 6 6 6 6 6 6 6 61.4 34.0 37.0 40.0 7 7.5 6 6 6 63.1 127 139 151 5 5 10 FT 11 13 10 7 7.5 7 6 59.8 34.3 37.3 40.3 7 7 6 6.5 59.8 128 140 152 5 10 FT 11 13 10 7 6.5 6 6 54.8 36.1 39.3 42.4 7 6.5 6 6.5 59.8 129 141 153 5 12 FT 12 14 10 7 6.5 6 6 6 48.1 33.9 36.8 39.6 7 6.5 6 6 6 53.1 130 142 154 5 14 FT 12 14 10 7 6.5 6 6 6 48.1 33.9 36.8 39.6 7 6 6 6 6 48.1 130 142 154 5 14 FT 13 15 10 7 6 7 7 51.5 34.4 37.3 40.1 7 6 6 6 6 48.1 131 143 155 5 18 FT 14 16 11 7 6 7 7.5 51.8 39.1 42.4 45.6 8 7.5 6 6 6 48.1 131 143 155 5 12 FT 15 18 11 8 7.5 7 7 58.5 37.0 40.0 43.0 8 7.5 6 7 46.8 134 146 158 5 12 FT 17 19 12 8 7.5 6 6 6 53.8 39.8 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 12 FT 18 20 12 8 7 7 7.5 58.8 39.8 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 12 FT 19 21 13 8 7 7 7 8 59.5 40.0 43.0 8 7.5 6 7 49.0 137 149 161 5 5 12 FT 19 21 13 8 7 7 7 8 59.5 40.0 43.0 8 7 6 6.5 49.0 138 150 162 5 13 FT 12 13 8 7 7 7 8 59.5 46.8 49.9 8 7 6 6.5 49.0 138 150 162 5 13 FT 12 2 24 14 8 6.5 7 7.5 59.5 46.8 49.6 53.1 8 7 6 6 6.5 49.6 142 154 166 5 13 FT 12 14 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 138 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 138 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.9 145 157 169 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 50.8 50.1 53.8 57.3 8 6.5 6 6.5 49.9 145 157 169 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 50.8 50.1 53.8 57.3 8 6.5 6 6.5 49.9 145 157 169 6 40 FT 12 2 2 2 11 8 6 7 7 7.5 59.9 50.8 5	E SPA.	PA.	G
4 FT         10         11         9         7         7.5         6         6         72.6         34.0         37.0         40.0         7         7.5         6         6         77.5         127         139         151         5           6 FT         10         11         10         6         6         6         6         6.1.4         34.0         37.0         40.0         7         7.5         6         6         63.1         127         139         151         5           8 FT         10         12         10         7         7.5         7         6         59.8         34.3         37.3         40.3         7         7         6         6.5         59.8         140         152         5           10 FT         11         31         10         7         7         6         6         54.8         36.1         39.3         42.4         7         6.5         6         6         53.1         130         142         154         5           12 FT         12         14         10         7         6.5         6         6         51.5         33.9         36.8         39.6         7<	9	9	1
6 FT 10 11 10 6 6 6 6 6 6 6 6 6 6 6 6 6 4 34.0 37.0 40.0 7 7.5 6 6 6 6 3.1 127 139 151 5 8 FT 10 12 10 7 7.5 7 6 59.8 34.3 37.3 40.3 7 7 6 6.5 59.8 128 140 152 5 10 FT 11 13 10 7 7 6 6 6 54.8 36.1 39.3 42.4 7 6.5 6 6.5 56.5 129 141 153 5 12 FT 12 14 10 7 6.5 6 6 6 51.5 33.9 36.8 39.6 7 6.5 6 6 53.1 130 142 154 5 14 FT 12 14 10 7 6.5 6 6 6 48.1 33.9 36.8 39.6 7 6 6 6 6 48.1 130 142 154 5 16 FT 13 15 10 7 6 7 7 51.5 34.4 37.3 40.1 7 6 6 6 6 48.1 131 143 155 5 18 FT 14 16 11 7 6 7 7.5 51.8 39.1 42.4 45.6 8 7.5 6 6 6 48.1 131 143 155 5 12 FT 15 18 11 8 7.5 7 7 58.5 37.0 40.0 43.0 8 7.5 6 7 46.8 134 146 158 5 12 FT 17 19 12 8 7.5 6 6 6 53.8 39.3 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 12 FT 19 11 3 8 7 7 8 59.1 40.3 43.4 45.5 8 7.5 6 7 48.8 135 147 159 5 12 FT 19 11 3 8 7 7 8 59.1 40.3 43.4 45.5 8 7 6 7 6 7 49.0 137 149 161 5 3 15 10 7 7 8 15 10 7 7 8 10 10 10 10 10 10 10 10 10 10 10 10 10	9	9	1
8 FT 10 12 10 7 7.5 7 6 59.8 34.3 37.3 40.3 7 7 6 6.5 59.8 128 140 152 5 10 FT 11 13 10 7 7 6 6 6 54.8 36.1 39.3 42.4 7 6.5 6 6.5 56.5 129 141 153 5 12 FT 12 14 10 7 6.5 6 6 6 51.5 33.9 36.8 39.6 7 6.5 6 6 53.1 130 142 154 5 14 FT 12 14 10 7 6.5 6 6 6 48.1 33.9 36.8 39.6 7 6 6 6 6 48.1 130 142 154 5 16 FT 13 15 10 7 6 7 7 51.5 34.4 37.3 40.1 7 6 6 6 6 48.1 131 143 155 5 18 FT 14 16 11 7 6 7 7.5 51.8 39.1 42.4 45.6 8 7.5 6 6.5 48.4 132 144 156 5 20 FT 15 18 11 8 7.5 7 7 58.5 37.0 40.0 43.0 8 7.5 6 7 46.8 134 146 158 5 22 FT 17 19 12 8 7.5 6 6 6 53.8 39.3 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 24 FT 18 20 12 8 7 7 7.5 58.8 39.8 42.9 46.0 8 7 6 6.5 48.8 136 148 160 5 26 FT 19 21 13 8 7 7 8 59.1 40.3 43.4 45.6 48.9 8 7 6 6.5 49.0 137 149 161 5 30 FT 21 23 14 8 6.5 7 7.5 59.5 46.1 49.6 53.1 8 7 6 6.5 49.0 138 150 162 5 34 FT 22 24 14 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.3 141 153 165 5 36 FT 24 26 15 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 25 27 15 8 6 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 27 29 16 8 6 7 7.5 59.9 50.8 54.3 57.9 8 6.5 6 6.5 49.9 145 155 167 6 44 FT 28 30 16 8 6 7 7.5 60.3 53.6 57.4 61.1 8 6 6 6 6.5 49.9 146 158 170 6	8.5	3.5	C
10 FT 11 13 10 7 7 6 6 6 54.8 36.1 39.3 42.4 7 6.5 6 6.5 56.5 129 141 153 5 12 FT 12 14 10 7 6.5 6 6 6 51.5 33.9 36.8 39.6 7 6.5 6 6 53.1 130 142 154 5 14 FT 12 14 10 7 6.5 6 6 6 48.1 33.9 36.8 39.6 7 6 6 6 6 48.1 130 142 154 5 16 FT 13 15 10 7 6 7 7 51.5 34.4 37.3 40.1 7 6 6 6 6 48.1 131 143 155 5 18 FT 14 16 11 7 6 7 7.5 51.8 39.1 42.4 45.6 8 7.5 6 6.5 48.4 132 144 156 5 2 7 7 19 12 8 7.5 6 6 53.8 39.8 42.9 46.0 8 7 6 6.5 48.8 135 147 159 5 2 4 FT 18 20 12 13 8 7 7 7 8 59.1 42.4 45.6 48.9 8 7 6 6.5 48.8 136 148 160 5 2 8 FT 20 22 13 8 7 7 7 8 59.1 42.4 45.6 48.9 8 7 6 6.5 49.0 138 150 162 5 3 16 FT 21 23 14 8 6.5 7 7.5 59.5 46.8 50.1 53.6 8 6.5 6 6.5 49.3 140 152 164 5 3 18 FT 24 26 15 8 6.5 7 7.5 59.9 50.1 53.8 57.9 8 6.5 6 6.5 49.6 142 154 156 168 6 42 FT 27 29 16 8 6 7 7.5 60.3 53.6 57.4 61.1 8 6 6 6 6.5 49.9 146 158 170 6	9	9	C
12 FT         12 14         10         7         6.5         6         6         51.5         33.9         36.8         39.6         7         6.5         6         6         53.1         130         142         154         5           14 FT         12         14         10         7         6.5         6         6         48.1         33.9         36.8         39.6         7         6         6         6         48.1         130         142         154         5           16 FT         13         15         10         7         6         7         7         51.5         34.4         37.3         40.1         7         6         6         48.1         131         143         155         5           18 FT         14         16         11         7         6         7         7.5         51.8         39.1         42.4         45.6         8         7.5         6         6.5         48.4         132         144         156         5           20 FT         15         18         11         8         7.5         6         6         53.8         39.3         42.4         45.6         8	9	9	C
14 FT         12 14         10         7         6.5         6         6         48.1         33.9         36.8         39.6         7         6         6         6         48.1         130         142         154         5           16 FT         13         15         10         7         6         7         7         51.5         34.4         37.3         40.1         7         6         6         48.1         131         143         155         5           18 FT         14         16         11         7         6         7         7.5         51.8         39.1         42.4         45.6         8         7.5         6         6.5         48.4         132         144         156         5           20 FT         15         18         11         8         7.5         7         7         58.5         37.0         40.0         43.0         8         7.5         6         6         53.8         39.3         42.4         45.5         8         7.5         6         7         46.8         134         146         158         5         22 FT         17         19         12         8         7.5	8.5	3.5	C
16 FT 13 15 10 7 6 7 7 51.5 34.4 37.3 40.1 7 6 6 6 6 48.1 131 143 155 5 18 FT 14 16 11 7 6 7 7.5 51.8 39.1 42.4 45.6 8 7.5 6 6.5 48.4 132 144 156 5 20 FT 15 18 11 8 7.5 7 7 58.5 37.0 40.0 43.0 8 7.5 6 7 46.8 134 146 158 5 22 FT 17 19 12 8 7.5 6 6 53.8 39.3 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 24 FT 18 20 12 8 7 7 7.5 58.8 39.8 42.9 46.0 8 7 6 6.5 48.8 136 148 160 5 26 FT 19 21 13 8 7 7 8 59.1 40.3 43.4 46.5 8 7 6 7 49.0 137 149 161 5 28 FT 20 22 13 8 7 7 7.55 59.1 42.4 45.6 48.9 8 7 6 6.5 49.0 138 150 162 5 30 FT 21 23 14 8 7 7 8 59.5 46.1 49.6 53.1 8 7 6 7 49.3 139 151 163 5 32 FT 22 24 14 8 6.5 7 7.5 59.5 46.8 50.1 53.6 8 6.5 6 6.5 49.3 140 152 164 5 34 FT 23 25 14 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.3 141 153 165 5 36 FT 24 26 15 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 25 27 15 8 6 7 7.5 59.9 50.1 53.8 57.9 8 6.5 6 6.5 49.6 142 154 166 5 40 FT 27 29 16 8 6 7 7.5 60.3 53.6 57.4 61.1 8 6 6 6 6.5 49.9 146 158 170 6	8	8	C
18 FT         14         16         11         7         6         7         7.5         51.8         39.1         42.4         45.6         8         7.5         6         6.5         48.4         132         144         156         5           20 FT         15         18         11         8         7.5         7         7         58.5         37.0         40.0         43.0         8         7.5         6         7         46.8         134         146         158         5           22 FT         17         19         12         8         7.5         6         6         53.8         39.3         42.4         45.5         8         7.5         6         7         48.8         135         147         159         5           24 FT         18         20         12         8         7         7         7.5         58.8         39.8         42.9         46.0         8         7         6         6.5         48.8         135         147         159         5           26 FT         19         21         13         8         7         7         7.5         59.1         40.3         43.0	9.5	9.5	C
20 FT 15 18 11 8 7.5 7 7 58.5 37.0 40.0 43.0 8 7.5 6 7 46.8 134 146 158 5 22 FT 17 19 12 8 7.5 6 6 53.8 39.3 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 24 FT 18 20 12 8 7 7 7.5 58.8 39.8 42.9 46.0 8 7 6 6.5 48.8 136 148 160 5 26 FT 19 21 13 8 7 7 8 59.1 40.3 43.4 46.5 8 7 6 7 49.0 137 149 161 5 28 FT 20 22 13 8 7 7 7.5 59.1 42.4 45.6 48.9 8 7 6 6.5 49.0 138 150 162 5 30 FT 21 23 14 8 7 7 8 59.5 46.1 49.6 53.1 8 7 6 7 49.3 139 151 163 5 32 FT 22 24 14 8 6.5 7 7.5 59.5 46.8 50.1 53.6 8 6.5 6 6.5 49.3 140 152 164 5 34 FT 23 25 14 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.3 141 153 165 5 36 FT 24 26 15 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 25 27 15 8 6 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.6 142 154 166 6 40 FT 26 28 15 8 6 7 7.5 59.9 50.1 53.8 57.9 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 26 28 15 8 6 7 7.5 59.9 50.8 54.3 57.9 8 6.5 6 6.5 49.9 146 158 170 6	8	8	C
22 FT 17 19 12 8 7.5 6 6 53.8 39.3 42.4 45.5 8 7.5 6 7 48.8 135 147 159 5 24 FT 18 20 12 8 7 7 7.5 58.8 39.8 42.9 46.0 8 7 6 6.5 48.8 136 148 160 5 26 FT 19 21 13 8 7 7 8 59.1 40.3 43.4 46.5 8 7 6 7 49.0 137 149 161 5 28 FT 20 22 13 8 7 7 7.5 59.1 42.4 45.6 48.9 8 7 6 6.5 49.0 138 150 162 5 30 FT 21 23 14 8 7 7 8 59.5 46.1 49.6 53.1 8 7 6 7 49.3 139 151 163 5 32 FT 22 24 14 8 6.5 7 7.5 59.5 46.8 50.1 53.6 8 6.5 6 6.5 49.3 140 152 164 5 34 FT 23 25 14 8 6.5 7 7.5 59.5 44.0 47.3 50.5 8 6.5 6 6.5 49.3 141 153 165 5 36 FT 24 26 15 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 25 27 15 8 6 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.6 142 154 166 5 40 FT 26 28 15 8 6 7 7.5 59.9 50.8 54.3 57.9 8 6.5 6 6.5 49.6 143 155 167 6 40 FT 26 28 15 8 6 7 7.5 60.3 51.3 54.9 58.5 8 6 6 6 6.5 49.9 146 158 170 6	8.5	3.5	C
24 FT         18         20         12         8         7         7         7.5         58.8         39.8         42.9         46.0         8         7         6         6.5         48.8         136         148         160         5           26 FT         19         21         13         8         7         7         8         59.1         40.3         43.4         46.5         8         7         6         7         49.0         137         149         161         5           28 FT         20         22         13         8         7         7         7.5         59.1         42.4         45.6         48.9         8         7         6         6.5         49.0         138         150         162         5           30 FT         21         23         14         8         7         7         8         59.5         46.1         49.6         53.1         8         7         6         7         49.3         139         151         163         5           32 FT         22         24         14         8         6.5         7         7.5         59.5         46.8         50.1         53	7.5	7.5	C
26 FT       19       21       13       8       7       7       8       59.1       40.3       43.4       46.5       8       7       6       7       49.0       137       149       161       5         28 FT       20       22       13       8       7       7       7.5       59.1       42.4       45.6       48.9       8       7       6       6.5       49.0       138       150       162       5         30 FT       21       23       14       8       7       7       8       59.5       46.1       49.6       53.1       8       7       6       7       49.3       139       151       163       5         32 FT       22       24       14       8       6.5       7       7.5       59.5       46.8       50.1       53.6       8       6.5       6       6.5       49.3       140       152       164       5         34 FT       23       25       14       8       6.5       7       7.5       59.5       46.8       50.1       53.6       8       6.5       6       6.5       49.3       140       152       164       5	7.5	7.5	C
28 FT 20 22 13 8 7 7 7.5 59.1 42.4 45.6 48.9 8 7 6 6.5 49.0 138 150 162 5 30 FT 21 23 14 8 7 7 8 59.5 46.1 49.6 53.1 8 7 6 7 49.3 139 151 163 5 32 FT 22 24 14 8 6.5 7 7.5 59.5 46.8 50.1 53.6 8 6.5 6 6.5 49.3 140 152 164 5 34 FT 23 25 14 8 6.5 7 7.5 59.5 44.0 47.3 50.5 8 6.5 6 6.5 49.3 141 153 165 5 36 FT 24 26 15 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 25 27 15 8 6 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.6 142 154 166 5 40.7 152 167 6 42 FT 27 29 16 8 6 7 7.5 59.9 50.8 54.3 57.9 8 6.5 6 6.5 49.6 144 156 168 6 42 FT 27 29 16 8 6 7 7.5 60.3 51.3 54.9 58.5 8 6 6 6 6.5 49.9 145 157 169 6 44 FT 28 30 16 8 6 7 7.5 60.3 53.6 57.4 61.1 8 6 6 6 6.5 49.9 146 158 170 6	7	7	C
30 FT 21 23 14 8 7 7 8 59.5 46.1 49.6 53.1 8 7 6 7 49.3 139 151 163 5 32 FT 22 24 14 8 6.5 7 7.5 59.5 46.8 50.1 53.6 8 6.5 6 6.5 49.3 140 152 164 5 34 FT 23 25 14 8 6.5 7 7 59.5 44.0 47.3 50.5 8 6.5 6 6.5 49.3 141 153 165 5 36 FT 24 26 15 8 6.5 7 7.5 59.9 49.5 53.1 56.8 8 6.5 6 6.5 49.6 142 154 166 5 38 FT 25 27 15 8 6 7 7.5 59.9 50.1 53.8 57.3 8 6.5 6 6.5 49.6 142 154 166 5 40.5 167 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	7	7	C
32 FT       22       24       14       8       6.5       7       7.5       59.5       46.8       50.1       53.6       8       6.5       6       6.5       49.3       140       152       164       5         34 FT       23       25       14       8       6.5       7       7       59.5       44.0       47.3       50.5       8       6.5       6       6.5       49.3       141       153       165       5         36 FT       24       26       15       8       6.5       7       7.5       59.9       49.5       53.1       56.8       8       6.5       6       6.5       49.6       142       154       166       5         38 FT       25       27       15       8       6       7       7.5       59.9       50.1       53.8       57.3       8       6.5       6       6.5       49.6       142       154       166       5         38 FT       25       27       15       8       6       7       7.5       59.9       50.1       53.8       57.3       8       6.5       6       6.5       49.6       143       155       167       <	6.5	5.5	C
34 FT       23       25       14       8       6.5       7       7       59.5       44.0       47.3       50.5       8       6.5       6       6.5       49.3       141       153       165       5         36 FT       24       26       15       8       6.5       7       7.5       59.9       49.5       53.1       56.8       8       6.5       6       6.5       49.6       142       154       166       5         38 FT       25       27       15       8       6       7       7.5       59.9       50.1       53.8       57.3       8       6.5       6       6.5       49.6       143       155       167       6         40 FT       26       28       15       8       6       7       7       59.9       50.8       54.3       57.9       8       6.5       6       6.5       49.6       143       155       167       6         40 FT       26       28       15       8       6       7       7       59.9       50.8       54.3       57.9       8       6.5       6       6.5       49.6       144       156       168       6 </td <td>7</td> <td>7</td> <td>C</td>	7	7	C
36 FT     24     26     15     8     6.5     7     7.5     59.9     49.5     53.1     56.8     8     6.5     6     6.5     49.6     142     154     166     5       38 FT     25     27     15     8     6     7     7.5     59.9     50.1     53.8     57.3     8     6.5     6     6.5     49.6     143     155     167     6       40 FT     26     28     15     8     6     7     7     59.9     50.8     54.3     57.9     8     6.5     6     6.5     49.6     144     156     168     6       42 FT     27     29     16     8     6     7     7.5     60.3     51.3     54.9     58.5     8     6     6     6.5     49.9     145     157     169     6       44 FT     28     30     16     8     6     7     7.5     60.3     53.6     57.4     61.1     8     6     6     6.5     49.9     146     158     170     6	6	6	C
38 FT     25     27     15     8     6     7     7.5     59.9     50.1     53.8     57.3     8     6.5     6     6.5     49.6     143     155     167     6       40 FT     26     28     15     8     6     7     7     59.9     50.8     54.3     57.9     8     6.5     6     6.5     49.6     144     156     168     6       42 FT     27     29     16     8     6     7     7.5     60.3     51.3     54.9     58.5     8     6     6     6.5     49.9     145     157     169     6       44 FT     28     30     16     8     6     7     7.5     60.3     53.6     57.4     61.1     8     6     6     6.5     49.9     146     158     170     6	6	6	C
40 FT     26     28     15     8     6     7     7     59.9     50.8     54.3     57.9     8     6.5     6     6.5     49.6     144     156     168     6       42 FT     27     29     16     8     6     7     7.5     60.3     51.3     54.9     58.5     8     6     6     6.5     49.9     145     157     169     6       44 FT     28     30     16     8     6     7     7.5     60.3     53.6     57.4     61.1     8     6     6     6.5     49.9     146     158     170     6	6	6	(
42 FT     27     29     16     8     6     7     7.5     60.3     51.3     54.9     58.5     8     6     6     6.5     49.9     145     157     169     6       44 FT     28     30     16     8     6     7     7.5     60.3     53.6     57.4     61.1     8     6     6     6.5     49.9     146     158     170     6	8	8	C
44 FT 28 30 16 8 6 7 7.5 60.3 53.6 57.4 61.1 8 6 6 6.5 49.9 146 158 170 6	8	8	C
	8	8	C
AC ET 00 70 AC 0 7 7 7 C 5 C0 7 E7 C E7 A C4 A D C C C AC 0 AAC AED 470 C	8	8	C
46 FT 28 30 16 9 7 7 6.5 60.3 53.6 57.4 61.1 8 6 6 6 49.9 146 158 170 6	8	8	C
48 FT 29 31 17 9 7 7.5 60.5 54.3 58.0 61.8 8 6 6 6.5 50.1 147 159 171 6	7.5	7.5	C
50 FT 30 32 17 9 7 7.5 60.5 54.9 58.6 62.3 8 6 6 6.5 50.1 148 160 172 6	7.5	7.5	C
SPAN (S) = 13 FT			
MEMBER TOP SLAB BARS BOTTOM SLAB BARS WALL BARS			

				SPAN	V (S	) =	13 F	Т		HE I	GHT	(HT	) =	15 F	T OR	16 F	Т			
		EMBE				ΤC	OP SLA	AB BAR	5				BOT:	TOM SI	_AB BAF	₹S		₩AI	L BAI	₹S
DESIGN	TH:	CKN	ESS	Α1	BARS			J3 BA	RS		A2	BARS			J4 BAF	RS		B:	2 BAR	ŝ
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	K HT=15'		SIZE	SPA.	SIZE	SPA.	C4	K HT=15′		SIZE	SPA.	G1
1 FT	13	13	11	6	6.5	5	6	98.5	34.1	36.3	6	6.5	6	7	100.3	189	201	5	7	12
2 FT	13	13	11	6	6.5	6	7.5	100.3	36.1	38.4	6	6.5	6	6.5	100.3	189	201	5	7	12
4 FT	10	13	11	6	6	6	6	100.3	35.6	37.8	6	6	6	6	100.3	189	201	5	6	0
6 FT	10	13	12	6	6.5	6	6	100.8	35.6	37.8	6	6	6	6	100.8	189	201	5	6	0
8 FT	11	13	12	6	6	6	6	94.1	35.9	38.0	7	7.5	6	6	100.8	189	201	6	8	0
10 FT	12	14	13	6	6	6	6.5	81.1	36.1	38.4	7	7	6	6	103.1	190	202	6	8.5	0
12 FT	13	15	14	6	6	6	6.5	74.8	38.6	40.9	7	7	6	6	85.0	191	203	5	6	0
14 FT	14	16	14	7	7.5	6	6	74.8	39.0	41.3	7	6.5	6	6	85.0	192	204	6	8	0
16 FT	14	16	14	7	7	6	6	68.0	39.0	41.3	7	6.5	6	6	73.1	192	204	5	6	0
18 FT	15	17	14	7	6.5	7	7.5	78.3	43.5	46.0	7	6	7	7	76.5	193	205	6	8	0
20 FT	16	18	15	7	6.5	7	7.5	78.6	43.9	46.4	7	6	7	8	75.3	194	206	6	8	0
22 FT	17	19	16	7	6.5	7	7.5	77.4	46.4	49.0	7	6	7	8	74.0	195	207	6	8	0
24 FT	18	20	16	7	6	7	7	77.4	46.9	49.5	8	7.5	7	7	74.0	196	208	6	8	0
26 FT	19	21	17	7	6	7	7	77.9	49.5	52.3	8	7.5	7	7	74.4	197	209	6	7.5	0
28 FT	20	23	18	7	6	7	7	78.3	48.0	50.6	8	7.5	7	7	74.9	199	211	6	7	0
30 FT	21	23	18	8	7.5	7	7	78.3	52.5	55.5	8	7	7	6.5	74.9	199	211	6	7	0
32 FT	22	24	19	8	7	7	7	78.8	53.0	55.9	8	7	7	6.5	73.5	200	212	6	6.5	0
34 FT	23	25	19	8	7	7	6	78.8	53.5	56.4	8	6.5	7	6	73.5	201	213	6	6.5	0
36 FT	24	26	20	8	7	7	6.5	79.3	54.0	56.9	8	6.5	7	6.5	73.9	202	214	6	6.5	0
38 FT	25	27	21	8	6.5	7	6.5	79.6	56.8	59.8	8	6.5	7	7	74.4	203	215	6	6	0
40 FT	25	28	22	8	6.5	7	6	78.4	57.0	60.0	8	6.5	7	7	74.8	204	216	6	6	0
42 FT	26	29	22	8	6.5	7	6	80.1	57.5	60.5	8	6.5	7	7	74.8	205	217	6	6	0
44 FT	27	30	23	8	6.5	7	6	80.5	58.0	61.0	8	6.5	7	7	75.1	206	218	7	7.5	0
46 FT	28	31	24	8	6	7	6.5	81.0	58.5	61.5	8	6	7	7	75.6	207	219	7	7.5	0
48 FT	29	31	24	8	6	7	6	81.0	61.1	64.3	8	6	7	6.5	75.6	207	219	7	7.5	0
50 FT	29	32	25	8	6	7	6	79.6	59.0	62.0	8	6	7	6.5	76.0	208	220	7	7	0



BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT & CULVERT.



#### ALTERNATE J3 BAR

ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

SHEET NO. 11 OF 14

CONCRETE

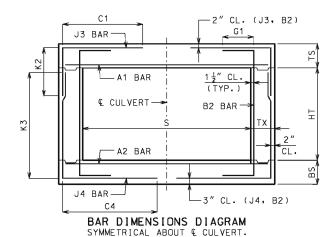
SPAN (S): 13 FEET HE[GHT (HT): 7 THRU 16 FEET

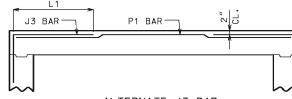
				SP	AN (	S)	= 14	FT		HE	IGHT	(H)	) =	7 F	T OR	8 FT	OR 9	9 FT				
		EMBE					TOP	SLAB E	BARS					E	BOTTO	/ SLAB	BARS			₩AI	_L BAF	₹S
DESIGN	THI	CKNE	SS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			B:	2 BARS	S
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	K2 HT=8'	HT=9'	SIZE	SPA.	S I ZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	SIZE	SPA.	G1
1 FT	13	12	8	6	6	5	7	102.1	33.3	37.1	41.0	6	6.5	6	6.5	66.9	92	104	116	5	12	12
2 FT	13	12	8	7	8	5	6	102.1	33.3	37.1	41.0	6	6	6	6	58.1	92	104	116	5	12	12
4 FT	10	11	8	7	6.5	7	6	52.8	34.0	38.1	42.1	7	7	6	6	49.3	91	103	115	5	12	0
6 FT	11	12	8	7	7	6	6	45.8	31.6	35.4	39.0	7	7	6	7	44.0	92	104	116	5	12	0
8 FT	11	12	8	7	6.5	7	6.5	45.8	35.8	39.9	44.1	7	6	6	6	42.3	92	104	116	5	12	0
10 FT	12	13	8	7	6	7	6.5	44.0	33.3	37.1	41.0	8	7.5	6	6.5	38.8	93	105	117	5	12	0
12 FT	12	14	8	8	7	7	6	42.3	36.8	41.0	45.1	8	7	6	7	37.0	94	106	118	5	12	0
14 FT	13	16	8	8	6.5	7	6	42.3	33.5	37.3	40.9	8	7	5	6	31.6	96	108	120	5	12	0
16 FT	13	16	8	8	6.5	7	6	40.5	33.5	37.3	40.9	8	7	5	6	31.6	96	108	120	5	12	0
18 FT	15	17	8	8	6.5	7	7	45.8	35.5	39.4	43.3	8	6.5	6	7.5	35.3	97	109	121	5	12	0
20 FT	16	19	8	8	6	7	6.5	45.8	36.5	40.4	44.1	8	7	5	6	31.6	99	111	123	5	11.5	0
22 FT	18	20	8	8	6	7	7.5	45.8	38.6	42.6	46.5	8	6.5	6	7.5	35.3	100	112	124	5	9.5	0
24 FT	19	21	8	8	6	7	7	45.8	44.0	48.5	52.9	8	6.5	6	7.5	35.3	101	113	125	5	9.5	0
26 FT	21	23	9	8	6	6	6.5	42.5	41.9	45.9	50.0	8	6.5	5	6	33.6	103	115	127	5	8.5	0
28 FT	22	24	9	8	6	6	6	42.5	46.3	50.8	55.1	8	6.5	6	7	35.4	104	116	128	5	8.5	0
30 FT	23	25	10	8	6	6	6.5	42.8	43.1	47.3	51.4	8	6.5	5	6	33.9	105	117	129	5	8.5	0
32 FT	24	26	10	9	7.5	6	6	42.8	45.1	49.4	53.5	8	6	5	6	33.9	106	118	130	5	8	0
34 FT	25	27	11	9	7	6	7	43.0	45.9	50.0	54.3	8	6	5	6	34.0	107	119	131	5	8.5	0
36 FT	26	28	11	9	7	6	7	43.0	46.5	50.8	55.0	8	6	5	6	34.0	108	120	132	5	7.5	0
38 FT	27	29	11	9	7	6	7	43.0	51.3	55.9	60.4	8	6	6	7.5	37.6	109	121	133	5	7.5	0
40 FT	28	30	11	9	7	6	6.5	43.0	52.0	56.6	61.1	8	6	6	7	37.6	110	122	134	5	7.5	0
42 FT	29	31	12	9	6.5	6	7	43.3	54.3	58.9	63.6	9	7.5	6	7.5	37.8	111	123	135	5	7	0
44 FT	30	32	12	9	6.5	6	7	43.3	55.0	59.6	64.4	9	7	6	7.5	37.8	112	124	136	5	7	0
46 FT	31	33	12	9	6.5	6	7	43.3	55.8	60.5	65.1	9	7	6	7	37.8	113	125	137	5	7	0
48 FT	32	33	12	9	6.5	6	7	43.3	56.1	60.9	65.5	9	7	6	7	37.8	113	125	137	5	7	0
50 FT	33	34	12	9	6.5	6	7	43.3	58.4	63.3	68.0	9	7	6	7	37.8	114	126	138	5	6.5	0

				SPAN	v (S	) =	14 F	Т		HE I	GHT	(HT	) =	13 F	T OR	14 F	T			
	М	EMBE		<u> </u>				AB BARS	5		<u> </u>	****	ВОТ	_	LAB BAF		•	WAL	L BAI	RS
DESIGN		CKNE		A1	BARS			J3 BA	RS		A2	BARS			J4 BAF	₹S		B2	2 BAR	S
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	K HT=13'	2 HT=14'	SIZE	SPA.	SIZE	SPA.	C4	K HT=13'	.3 HT=14	SIZE	SPA.	G1
1 FT	12	12	10	6	6	6	7	105.0	36.8	39.3	6	6	6	6	105.0	164	176	5	8	12
2 FT	13	13	10	7	8	6	7	105.0	35.4	37.8	7	8	6	6.5	105.0	165	177	5	8	12
4 FT	11	12	10	7	7.5	6	6.5	105.0	36.5	39.0	7	7	6	6	105.0	164	176	5	8	0
6 FT	11	13	10	7	7.5	6	6	76.5	35.0	37.4	7	7	6	6	87.3	165	177	5	8	0
8 FT	11	13	11	7	7.5	6	6	66.3	35.0	37.4	7	6.5	6	6	71.6	165	177	5	7.5	0
10 FT	12	14	11	7	7	6	6	64.5	37.1	39.8	7	6	6	6	68.0	166	178	5	7.5	0
12 FT	13	15	12	7	6.5	6	6	61.3	37.6	40.1	7	6	6	6.5	64.8	167	179	5	7	0
14 FT	14	16	13	7	6.5	6	6	59.8	38.0	40.5	7	6	6	6.5	63.4	168	180	5	6.5	0
16 FT	14	16	13	7	6	7	8	59.8	38.0	40.5	8	7.5	6	6	56.1	168	180	5	7.5	0
18 FT	15	18	13	7	6	7	7	67.0	40.5	43.1	8	7.5	6	6.5	56.1	170	182	5	6.5	0
20 FT	16	19	13	8	7	7	6.5	65.1	40.9	43.5	8	7	6	6	56.1	171	183	5	6.5	0
22 FT	18	20	14	8	7	7	7	65.5	43.5	46.3	8	7	6	6	56.4	172	184	5	6	0
24 FT	19	22	14	8	7	7	7	65.5	44.1	46.9	8	7	6	6	56.4	174	186	5	6	0
26 FT	20	23	15	8	6.5	7	7	65.9	44.6	47.4	8	6.5	6	6	56.8	175	187	6	8	0
28 FT	21	24	15	8	6.5	7	6.5	65.9	45.1	47.9	8	6.5	6	6	56.8	176	188	6	8	0
30 FT	22	25	16	8	6.5	7	6.5	66.3	47.5	50.4	8	6.5	6	6	57.0	177	189	6	8	0
32 FT	23	26	16	8	6	7	6	66.3	50.0	53.0	8	6	7	8	58.9	178	190	6	8	0
34 FT	24	27	17	8	6	7	6	66.6	48.5	51.4	8	6	6	6	57.4	179	191	6	7.5	0
36 FT	25	28	17	8	6	7	6	66.6	53.0	56.1	8	6	7	8	59.3	180	192	6	7.5	0
38 FT	26	29	18	9	7.5	7	6	67.0	51.5	54.5	8	6	6	6	57.6	181	193	6	7	0
40 FT	27	30	18	9	7	7	6	67.0	54.1	57.3	8	6	7	8	61.4	182	194	6	7	0
42 FT	28	31	19	9	7	7	6	67.4	52.5	55.5	9	7.5	6	6	58.0	183	195	6	6.5	0
44 FT	29	32	19	9	7	7	6	67.4	57.3	60.5	9	7	7	8	61.8	184	196	6	6.5	0
46 FT	30	33	20	9	7	7	6.5	67.6	55.6	58.8	9	7	6	6	58.3	185	197	6	6.5	0
48 FT	31	34	20	9	6.5	7	6	67.6	58.4	61.5	9	7	7	8	62.0	186	198	6	6.5	0
50 FT	32	35	21	9	6.5	7	6.5	69.9	56.6	59.8	9	7	6	6	58.6	187	199	6	6	0

				SPA	N (S	5) =	14	FT		HE I	GHT	(HT)	= 1	0 F	T OR	11 F	T OR	12 F	Т			
		EMBE					TOP	SLAB E	BARS					E	вотто!	√I SLAB	BARS			₩AL	L BAF	₹S
DESIGN	TH!	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			B2	BAR	3
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	K2 HT=11'	HT=12'	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	K3 HT=11'	HT=12′	SIZE	SPA.	G1
1 FT	13	12	9	6	6	5	6.5	102.6	33.6	36.5	39.4	6	6	6	6	106.3	128	140	152	5	9	12
2 FT	13	12	9	7	7.5	5	6	102.6	33.6	36.5	39.4	7	7.5	6	6	106.3	128	140	152	5	8.5	12
4 FT	11	12	9	7	7	6	6.5	69.0	35.9	39.0	42.1	7	7.5	6	6	72.6	128	140	152	5	9	0
6 FT	11	12	9	7	7	6	6	60.1	35.9	39.0	42.1	7	6.5	6	6	62.0	128	140	152	5	9	0
8 FT	11	12	10	7	7	6	6	55.1	35.9	39.0	42.1	7	6.5	6	6	57.0	128	140	152	5	10	0
10 FT	12	13	10	7	6.5	6	6	53.4	36.4	39.5	42.6	7	6	6	6	53.4	129	141	153	5	9.5	0
12 FT	12	14	10	8	7.5	7	6	55.1	36.6	39.8	42.9	8	7	6	6	51.6	130	142	154	5	9	0
14 FT	FT 14 16 10 8 7 7 7 49.9 39.1 42.4 45.6 8 7 6 6.5 46.3 132 144 156 5															5	8	0				
16 FT	FT 14 16 10 8 7 7 7 49.9 39.1 42.4 45.6 8 7 6 6.5 46.3 132 144 156 5 FT 15 17 11 8 7 7 7.5 59.1 39.8 42.9 46.1 8 7 6 6 46.5 133 145 157 5															5	9	0				
18 FT	T 14 16 10 8 7 7 7 49.9 39.1 42.4 45.6 8 7 6 6.5 46.3 132 144 156 5 TT 15 17 11 8 7 7 7.5 59.1 39.8 42.9 46.1 8 7 6 6 46.5 133 145 157 5															5	9.5	0				
20 FT	TT 15 17 11 8 7 7 7.5 59.1 39.8 42.9 46.1 8 7 6 6 46.5 133 145 157 5 TT 16 19 11 8 6.5 7 6.5 57.3 37.5 40.5 43.5 8 7 6 7 46.5 135 147 159 5															5	8	0				
22 FT	18	20	12	8	7	7	7.5	57.6	39.8	42.9	46.0	8	7	6	6.5	46.8	136	148	160	5	8	0
24 FT	19	21	12	8	6.5	7	7	57.6	43.4	46.8	50.1	8	6.5	6	6.5	46.8	137	149	161	5	7.5	0
26 FT	20	23	13	8	6.5	7	7	57.9	41.1	44.3	47.4	8	6.5	6	7	47.0	139	151	163	5	7.5	0
28 FT	21	24	13	8	6	7	6.5	57.9	43.3	46.5	49.6	8	6.5	6	7	47.0	140	152	164	5	7	0
30 FT	22	25	14	8	6	7	6.5	58.3	43.8	47.0	50.3	8	6.5	6	7	47.4	141	153	165	5	7	0
32 FT	24	26	14	8	6	7	7.5	58.3	46.3	49.5	52.9	8	6	6	6.5	47.4	142	154	166	5	6.5	0
34 FT	25	27	14	8	6	7	7.5	58.3	46.8	50.1	53.5	8	6	6	6.5	47.4	143	155	167	5	6	0
36 FT	26	28	14	9	7.5	7	6.5	58.3	47.4	50.6	54.0	8	6	6	6.5	47.4	144	156	168	5	6	0
38 FT	27	29	15	9	7	7	7.5	58.5	51.3	54.9	58.5	8	6	6	6.5	47.6	145	157	169	6	8	0
40 FT	28	30	15	9	7	7	7.5	58.5	53.6	57.4	61.1	8	6	6	6.5	47.6	146	158	170	6	8	0
42 FT	29	31	15	9	7	7	6.5	58.5	54.3	58.0	61.8	9	7.5	6	6.5	47.6	147	159	171	6	8	0
44 FT	30	32	16	9	7	7	7.5	58.9	54.9	58.6	62.3	9	7	6	6.5	49.6	148	160	172	6	8	0
46 FT	31	33	16	9	6.5	7	7.5	58.9	55.5	59.3	62.9	9	7	6	6.5	49.6	149	161	173	6	8	0
48 FT	31	33	16	9	6.5	7	6.5	58.9	55.5	59.3	62.9	9	7	6	6	49.6	149	161	173	6	8	0
50 FT	32	34	17	9	6.5	7	7	59.3	56.1	59.9	63.5	9	7	6	6.5	50.0	150	162	174	6	7.5	0
																46 ==						
				SPAN	<u>(S</u>	) =	14 F	T		HEI	GHT (	HT)	= 1	5 FT	OR	16 F	Γ			J		

				SPAN	V (S	•		Т		HE I	GHT	(HT		15 F		16 F	Т			
		EMBE				TO	DP SL	AB BARS	5				BOT.	TOM SI	_AB BAF	RS		₩Al	L BAF	RS
DESIGN	TH:	CKN	ESS	Α1	BARS			J3 BA			A2	BARS			J4 BAI			B2	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	K HT=15'	2 HT=16'	SIZE	SPA.	SIZE	SPA.	C4	K HT=15′		SIZE	SPA.	G1
1 FT	12	13	11	6	6	6	6	105.6	36.0	38.1	6	6	6	6.5	105.6	189	201	5	7	12
2 FT	13	14	11	6	6	6	7	105.6	38.4	40.6	6	6	6	6.5	105.6	190	202	5	7	12
4 FT	11	13	11	7	7.5	6	6	105.6	35.9	38.0	7	7.5	6	6	105.6	189	201	5	6	0
6 FT	11	13	12	6	6	6	6.5	99.0	35.9	38.0	7	7	6	6	108.0	189	201	5	6	0
8 FT	12	14	12	7	8	6	6.5	86.4	36.1	38.4	7	7	6	6	108.0	190	202	5	6	0
10 FT	12	15	13	7	7.5	6	6	74.3	36.4	38.5	7	6.5	6	6.5	90.5	191	203	5	6	0
12 FT	13	16	14	7	7	6	6	71.0	38.8	41.0	7	6.5	6	6.5	81.9	192	204	5	6	0
14 FT	14	17	14	7	6.5	7	7.5	72.8	39.1	41.4	7	6	6	6	78.3	193	205	5	6	0
16 FT	14	17	14	7	6.5	7	7.5	67.4	39.1	41.4	7	6	6	6	69.1	193	205	5	6	0
18 FT	15	18	14	7	6	7	7	76.5	43.6	46.3	8	7	7	7	72.8	194	206	5	6	0
20 FT	16	19	15	8	7.5	7	6.5	75.0	44.1	46.6	8	7	7	7.5	71.4	195	207	6	8	0
22 FT	18	20	16	8	7.5	7	7	75.5	49.0	51.8	8	7	7	7	71.8	196	208	6	8	0
24 FT	19	22	16	8	7	7	6.5	75.5	47.5	50.1	8	7	7	7	71.8	198	210	6	8	0
26 FT	20	23	17	8	7	7	6.5	75.9	48.0	50.6	8	6.5	7	7	72.1	199	211	6	7.5	0
28 FT	21	24	18	8	7	7	6.5	76.3	48.4	51.0	8	6.5	7	7	70.6	200	212	6	7	0
30 FT	22	25	18	8	6.5	7	6	76.3	51.0	53.9	8	6.5	7	6.5	70.6	201	213	6	7	0
32 FT	23	26	19	8	6.5	7	6	76.6	51.5	54.3	8	6.5	7	7	71.0	202	214	6	6.5	0
34 FT	24	27	20	8	6.5	7	6	77.1	52.0	54.8	8	6	7	7	71.5	203	215	6	6.5	0
36 FT	25	28	20	8	6	7	6	77.1	52.5	55.3	8	6	7	6.5	71.5	204	216	6	6.5	0
38 FT	26	29	21	8	6	7	6	77.5	55.3	58.1	8	6	7	7	71.9	205	217	6	6	0
40 FT	27	30	22	8	6	7	6	77.9	58.0	61.0	8	6	7	7	72.3	206	218	6	6	0
42 FT	28	31	23	8	6	7	6.5	78.3	58.5	61.5	8	6	7	7.5	72.6	207	219	7	8	0
44 FT	29	32	23	9	7.5	7	6	78.3	59.0	62.0	9	7.5	7	7	72.6	208	220	7	7.5	0
46 FT	30	33	24	9	7	7	6	78.8	61.9	65.0	9	7	7	7	73.0	209	221	7	7.5	0
48 FT	31	34	25	9	7	7	6.5	79.1	62.4	65.5	9	7	7	7	73.4	210	222	7	7.5	0
50 FT	32	35	25	9	7	7	6	79.1	62.9	66.0	9	7	7	7	73.4	211	223	7	7	0





#### ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY, ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS, NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET HE[GHT (HT): 7 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

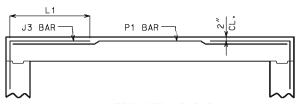
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SHEET NO. 12 OF 14

				SF	AN (	S)	= 15	FT		HE	IGHT	(H)	) =	8 F	T OR	9 FT	OR	10 FT				
		EMBE					TOP	SLAB E	BARS						BOTTO	/ SLAB	BARS			₩Al	L BAF	₹S
DESIGN	TH!	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			Ba	2 BARS	S
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10'	SIZE	SPA.	S I ZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10'	S I ZE	SPA.	G1
1 FT	12	13	8	7	7	6	7	109.0	32.5	35.9	39.3	6	6	6	7	82.8	105	117	129	5	12	12
2 FT	12	13	8	7	6.5	6	6.5	109.0	33.6	37.1	40.6	7	7.5	6	6.5	65.8	105	117	129	5	12	12
4 FT	11	12	8	7	6	6	6	52.6	35.4	39.0	42.8	7	7	6	6	52.6	104	116	128	5	12	0
6 FT	11	12	9	7	6.5	6	6	51.0	35.4	39.0	42.8	7	6.5	6	6	49.1	104	116	128	5	12	0
8 FT	11	12	9	7	6	7	6	51.0	35.4	39.0	42.8	8	7.5	6	6	47.3	104	116	128	5	12	0
10 FT	12	14	9	8	7.5	7	6	49.1	32.8	36.1	39.5	8	7	6	7	43.5	106	118	130	5	12	0
12 FT	13	15	9	8	6.5	7	6.5	47.3	34.5	38.0	41.5	8	6.5	6	7	41.6	107	119	131	5	12	0
14 FT	14	17	9	8	6.5	7	6.5	45.4	34.1	37.5	40.9	8	6.5	6	8	39.8	109	121	133	5	12	0
16 FT	14	17	9	8	6	7	6	43.5	34.1	37.5	40.9	8	6.5	6	8	37.8	109	121	133	5	12	0
18 FT	16	19	9	8	6	7	7	49.1	36.5	40.0	43.5	8	6.5	6	8	37.8	111	123	135	5	12	0
20 FT	17	20	9	9	7.5	7	6	49.1	37.1	40.6	44.1	8	6.5	6	7.5	37.8	112	124	136	5	11	0
22 FT	19	21	9	9	7.5	7	7	49.1	43.3	47.3	51.1	8	6	6	7	37.8	113	125	137	5	9	0
24 FT	21	23	10	8	6	6	6	43.8	41.9	45.6	49.3	8	6	6	8	38.0	115	127	139	5	9	0
26 FT	22	24	11	9	7.5	6	6	43.9	42.5	46.3	49.9	8	6	6	8	38.3	116	128	140	5	10.5	0
28 FT	23	25	11	9	7	6	6	43.9	43.1	46.8	50.5	8	6	6	8	38.3	117	129	141	5	9	0
30 FT	24	26	11	9	7	7	7.5	49.6	49.4	53.5	57.8	9	7.5	6	7	38.3	118	130	142	5	8	0
32 FT	26	28	12	9	7	6	6.5	46.1	46.4	50.3	54.1	8	6	6	8.5	38.4	120	132	144	5	8	0
34 FT	27	29	12	9	7	6	6.5	46.1	51.5	55.6	59.9	9	7.5	6	8	38.4	121	133	145	5	7.5	0
36 FT	28	30	12	9	6.5	6	6.5	46.1	52.1	56.4	60.5	9	7	6	8	38.4	122	134	146	5	7	0
38 FT	29	31	12	9	6.5	6	6	46.1	54.4	58.6	63.0	9	7	6	7.5	38.4	123	135	147	5	7	0
40 FT	30	32	13	9	6.5	6	6.5	46.4	55.1	59.4	63.8	9	7	6	7.5	40.5	124	136	148	5	6.5	0
42 FT	31	33	13	9	6.5	6	6.5	46.4	55.8	60.1	64.5	9	7	6	7	40.5	125	137	149	5	6.5	0
44 FT	32	34	13	9	6	6	6.5	46.4	56.5	60.9	65.1	9	6.5	6	7	40.5	126	138	150	5	6.5	0
46 FT	33	35	13	9	6	6	6.5	46.4	57.3	61.5	65.9	9	6.5	6	6.5	40.5	127	139	151	5	6.5	0
48 FT	34	36	13	9	6	6	6.5	46.4	59.6	64.0	68.5	9	6.5	6	6.5	40.5	128	140	152	5	6.5	0
50 FT	35	36	13	9	6	6	6.5	46.4	60.0	64.4	68.9	9	6.5	6	6	40.5	128	140	152	5	6	0

				SPA	N (S	;) =	15	FT		HE I	GHT	(HT)	= 1	4 F	T OR	15 F	T OR	16 F	T			
		EMBE					TOP	SLAB E	BARS					E	зотто	M SLAB	BARS			₩Al	LL BAF	RS
DESIGN	THI	CKNE	SS	A 1	BARS			J3	BARS			A2	BARS			J4	BARS			Ba	2 BARS	S
FILL	TS	BS	ΤX	SIZE	SPA.	S I ZE	SPA.	C1	HT=14'	K2 HT=15'	HT=16'	SIZE	SPA.	S I ZE	SPA.	C4	HT=14	K3 HT=15	HT=16	S I ZE	SPA.	G1
1 FT	13	14	11	7	8	6	7.5	112.8	36.1	38.4	40.6	7	8	6	7	112.8	178	190	202	5	7.5	12
2 FT	13	14	11	7	7.5	6	6.5	112.8	38.0	40.4	42.8	7	7.5	6	6.5	112.8	178	190	202	5	7	12
4 FT	12	13	11	7	7	6	6.5	112.8	37.6	40.0	42.4	7	7	6	6	112.8	177	189	201	5	6.5	0
6 FT	12	13	12	7	7.5	6	6.5	92.1	37.6	40.0	42.4	7	6.5	6	6	97.9	177	189	201	5	6.5	0
8 FT	12	14	13	7	7.5	6	6	77.3	37.8	40.3	42.6	7	6.5	6	6	84.9	178	190	202	5	6.5	0
10 FT	13	15	13	7	6.5	6	6	73.4	38.3	40.6	43.0	7	6	6	6	81.0	179	191	203	5	6.5	0
12 FT	14	16	14	7	6.5	7	8	73.8	38.6	41.0	43.4	8	7.5	6	6	75.6	180	192	204	5	6	0
14 FT	15	17	14	7	6	7	7	81.5	41.0	43.5	46.0	8	7	7	7.5	75.6	181	193	205	5	6	0
16 FT	16	18	15	8	7.5	7	7	80.0	45.3	48.1	50.9	8	7	7	7	74.1	182	194	206	6	8	0
18 FT	16	19	15	8	7	7	7	74.1	41.6	44.1	46.6	8	7	7	7.5	70.3	183	195	207	6	8	0
	17	20	15	8	7	7	6	74.1	46.0	48.8	51.5	8	6.5	7	7	68.3	184	196	208	6	8	0
22 FT	19	21	15	8	6.5	7	6	74.1	50.8	53.8	56.8	8	6	7	6	68.3	185	197	209	6	8	0
	20	23	16	8	6.5	7	6	74.5	47.4	50.1	52.9	8	6	7	6.5	68.6	187	199	211	6	8	0
26 FT	21	24	17	8	6	7	6	72.9	49.9	52.8	55.6	8	6	7	7	69.0	188	200	212	6	7.5	0
28 FT	23	25	17	8	6	7	6	72.9	54.9	58.0	61.1	8	6	7	6	69.0	189	201	213	6	7.5	0
30 FT	24	27	18	8	6	7	6	73.3	51.4	54.3	57.1	8	6	7	6.5	69.3	191	203	215	6	7	0
	25	28	19	8	6	7	6	73.6	49.6	52.5	55.3	8	6		7	69.6	192	204	216	6	6.5	0
34 FT	26	29	20	8	6	7	6	74.0	52.4	55.3	58.1	9	7.5	7	'	68.0	193	205	217	6	6.5	0
36 FT	27	30	21	9	7.5	7	6	74.4	52.8	55.6	58.5	9	7	7	7.5	68.4	194	206	218	6	6.5	0
	28	31 32	21	9	7	7	6	74.4	55.5 60.5	58.5 63.8	61.5	9	7	7	7	68.4	195 196	207	219	6	6	0
	30	33	23	9	7	7	6	77.1	61.0	64.3	67.5	9	7	7	7	69.0	196	208	221	6	-	0
42 FT	31	34	24	9	6.5	7	6	77.5	61.5	64.8	68.0	9	6.5	7	7	69.4	198	210	222	6	6	0
44 FT	32	35	24	9	6.5	7	6	77.5	62.1	65.4	68.6	9	6.5	7	7	69.4	198	210	223	7	8	0
	33	36	25	9	6.5	7	6	77.9	65.0	68.4	71.6	9	6.5	<del> </del>	7	69.8	200	212	223	7	8	0
	34	37	25	9	6.5	7	6	77.9	65.5	68.9	72.3	9	6.5	7	7	71.8	200	213	225	7	7.5	0
30 FT	J4	JI	23	3	0.5		U	11.3	05.5	00.3	12.3	l 3	0.5		_ ′	11.0	201	LIJ	1 223	_ ′	1.0	l o

	C1
K3	← A1 BAR 1½″ CL. (TYP.)  © CULVERT B2 BAR TX  S TX  A2 BAR
<u> </u>	J4 BAR
	BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT & CULVERT.



#### ALTERNATE J3 BAR

ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS.
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4. #5
AND #6 BARS. RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS. AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

				SPA	N (S	5) =	15	FΤ		HF 1	GHT	(HT)	= 1	1 F	T OR	12 F	T OR	13 F	Т			$\overline{}$
	M	EMBE	D	<u> </u>			TOP	SLAB E	BARS			<u> </u>			· •	VI SLAB			•	WAI	L BAI	35
DECTON		CKNE		Δ1	BARS		101		BARS			Δ2	BARS	<del> </del>	301101		BARS			19.5.5	BARS	-
DESIGN FILL									DAILO	K2							BAILO	К3				
	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	HT=12'	HT=13'	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	HT=12'	HT=13	SIZE	SPA.	G1
1 FT	12	12	9	7	7	6	6.5	109.6	36.3	39.1	42.0	7	7	6	6	109.6	140	152	164	5	8.5	12
2 FT	13	14	9	7	7	6	6.5	109.6	38.5	41.5	44.5	7	7.5	6	6	109.6	142	154	166	5	8.5	12
4 FT	11	12	10	7	6.5	6	6	74.1	36.0	38.9	41.8	7	7	6	6	76.0	140	152	164	5	8	0
6 FT	12	13	10	7	7	6	6.5	64.6	36.5	39.4	42.3	7	6.5	6	6.5	68.4	141	153	165	5	8	0
8 FT	12	13	10	7	6.5	6	6	58.9	36.5	39.4	42.3	7	6	6	6	62.8	141	153	165	5	8	0
10 FT	13	14	10	7	6	7	7	58.9	38.5	41.5	44.5	8	7	6	6	58.9	142	154	166	5	8	0
12 FT	13	15	10	8	7	7	6	57.0	38.8	41.8	44.8	8	6.5	7	6.5	58.9	143	155	167	5	8	0
14 FT	14	17	11	8	7	7	6.5	57.3	39.5	42.5	45.5	8	6.5	6	6	53.5	145	157	169	5	7.5	0
16 FT	14	17	11	8	6.5	7	6	53.5	39.5	42.5	45.5	8	6.5	6	6	49.6	145	157	169	5	8.5	0
18 FT	16	19	12	8	6.5	7	7	61.5	40.5	43.5	46.5	8	6.5	6	6.5	49.9	147	159	171	5	8.5	0
20 FT	17	20	12	8	6	7	6	61.5	41.0	44.0	47.0	8	6.5	6	6	49.9	148	160	172	5	7.5	0
22 FT	19	22	13	8	6.5	7	7	61.8	43.6	46.8	49.9	8	6.5	6	6.5	50.1	150	162	174	5	7.5	0
24 FT	20	23	13	8	6	7	6.5	59.9	44.3	47.4	50.5	8	6	6	6	50.1	151	163	175	5	6.5	0
26 FT	21	24	14	8	6	7	6	62.1	46.5	49.6	52.9	8	6	6	6.5	50.5	152	164	176	5	7	0
28 FT	23	25	14	8	6	7	7	60.1	47.3	50.5	53.8	8	6	6	6	50.5	153	165	177	5	6	0
30 FT	24	27	15	9	7.5	7	7	60.5	48.0	51.3	54.5	8	6	6	6.5	50.8	155	167	179	5	6	0
32 FT	25	28	15	9	7	7	6.5	60.5	50.4	53.8	57.1	8	6	6	6	50.8	156	168	180	6	8	0
34 FT	26	29	15	9	7	7	6	60.5	51.0	54.4	57.6	9	7.5	6	6	50.8	157	169	181	6	8	0
36 FT	27	30	16	9	7	7	6	60.8	51.5	54.9	58.3	9	7	6	6	51.0	158	170	182	6	8	0
38 FT	28	31	16	9	6.5	7	6	60.8	52.1	55.5	58.8	9	7	6	6	51.0	159	171	183	6	8	0
40 FT	29	32	17	9	6.5	7	6	61.1	54.5	58.0	61.5	9	7	6	6	51.3	160	172	184	6	7.5	0
42 FT	31	33	17	9	6.5	7	7	61.1	55.4	58.9	62.4	9	7	6	6	51.3	161	173	185	6	7.5	0
44 FT	32	34	17	9	6.5	7	6.5	61.1	57.9	61.5	65.1	9	6.5	6	6	51.3	162	174	186	6	7.5	0
46 FT	33	35	17	9	6	7	6	61.1	58.5	62.1	65.8	9	6.5	6	6	53.3	163	175	187	6	7.5	0
48 FT	34	36	18	9	6	7	7	61.4	59.1	62.8	66.3	9	6.5	6	6	53.5	164	176	188	6	7	0
50 FT	34	37	18	9	6	7	6	61.4	59.4	63.0	66.6	9	6.5	6	6	53.5	165	177	189	6	7	0

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 15 FEET HE[GHT (HT): 8 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

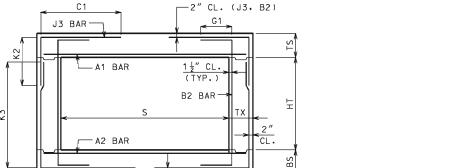
04/01/2011

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SHEET NO. 13 OF 14

				SP	AN (	S)	= 16	FT		HE	IGHT	(H)	) =	8 F	T OR	9 FT	OR	10 FT				
	М	EMBE	R				TOP	SLAB E	BARS						BOTTO	/ SLAB	BARS			₩AI	_L BAF	₹S
DESIGN	TH:	CKNE	ESS	Α1	BARS			J3	BARS			A2	BARS			J4	BARS			B:	2 BARS	S
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10'	SIZE	SPA.	S I ZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10'	SIZE	SPA.	G1
1 FT	12	13	8	7	6.5	6	6.5	116.0	37.1	41.0	44.8	7	7.5	6	6.5	76.0	105	117	129	5	12	12
2 FT	12	13	8	7	6	6	6	116.0	37.1	41.0	44.8	7	7	6	6	64.0	105	117	129	5	12	12
4 FT	12	12	9	7	6.5	6	6.5	54.3	36.8	40.6	44.5	7	6.5	6	6	54.3	104	116	128	5	12	0
6 FT	12	12	9	7	6	6	6.5	50.3	36.8	40.6	44.5	7	6	6	6	50.3	104	116	128	5	12	0
8 FT	12	13	9	8	7.5	7	6.5	50.3	37.1	41.0	44.8	8	7	6	6	46.3	105	117	129	5	12	0
10 FT	13	14	9	8	6.5	7	6.5	48.3	37.8	41.6	45.5	8	6.5	6	6	44.3	106	118	130	5	12	0
12 FT	14	16	9	8	6.5	7	6.5	46.3	35.1	38.6	42.0	8	6.5	6	7.5	40.3	108	120	132	5	12	0
14 FT	15	18	9	8	6	7	6	52.3	36.0	39.5	42.9	8	6	6	8	38.3	110	122	134	5	12	0
16 FT	16	19	9	9	7	7	6	50.3	36.5	40.0	43.5	8	6	6	7.5	38.3	111	123	135	5	12	0
18 FT	17	20	9	9	7	7	6.5	50.3	37.1	40.6	44.1	8	6	6	8	38.3	112	124	136	5	12	0
20 FT	19	21	9	9	7	7	7	50.3	39.3	42.9	46.5	8	6	6	7.5	38.3	113	125	137	5	10.5	0
22 FT	20	23	9	9	6.5	7	6.5	50.3	40.3	43.8	47.4	8	6	6	7.5	38.3	115	127	139	5	9	0
24 FT	22	24	10	9	7	7	7.5	50.5	42.5	46.3	49.9	9	7.5	6	7.5	38.4	116	128	140	5	9.5	0
26 FT	23	25	10	9	6.5	7	7	50.5	47.3	51.4	55.4	9	7	6	7	38.4	117	129	141	5	8.5	0
28 FT	25	27	11	9	6.5	6	6	46.8	45.8	49.6	53.5	9	7	6	8	40.6	119	131	143	5	8.5	0
30 FT	26	28	11	9	6.5	6	6	46.8	46.4	50.3	54.1	9	7	6	8	40.6	120	132	144	5	7.5	0
32 FT	28	29	11	9	6.5	6	6.5	46.8	53.3	57.6	61.9	9	7	6	7	40.6	121	133	145	5	7.5	0
34 FT	29	31	12	9	6.5	6	6.5	46.9	54.4	58.6	63.0	9	7	6	7.5	40.8	123	135	147	5	7	0
36 FT	30	32	12	9	6	6	6.5	46.9	55.1	59.4	63.8	9	6.5	6	7.5	40.8	124	136	148	5	7	0
38 FT	31	33	12	9	6	6	6.5	46.9	55.8	60.1	64.5	9	6.5	6	7	40.8	125	137	149	5	7	0
40 FT	32	34	12	9	6	6	6.5	46.9	56.5	60.9	65.1	9	6.5	6	7	40.8	126	138	150	5	7	0
42 FT	33	35	12	9	6	6	6	46.9	57.3	61.5	65.9	9	6.5	6	6.5	40.8	127	139	151	5	6.5	0
44 FT	34	36	13	10	7.5	6	6.5	47.1	59.6	64.0	68.5	9	6	6	6.5	41.0	128	140	152	5	6.5	0
46 FT	35	37	13	10	7	6	6	47.1	60.3	64.8	69.3	9	6	6	6.5	41.0	129	141	153	5	6.5	0
48 FT	36	38	13	10	7	6	6.5	47.1	61.0	65.5	69.9	9	6	6	6	41.0	130	142	154	5	6	0
50 FT	37	39	13	10	7	6	6	47.1	61.8	66.3	70.6	9	6	6	6	41.0	131	143	155	6	8.5	0
				•		•						•								•		

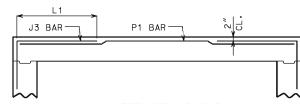
				SPA	N (S	5) =	16	FT		HE I	GHT	(HT)	= 1	4 F	T OR	15 F	T OR	16 F	T			$\neg$
	М	EMBE	R				TOP	SLAB E	BARS					E	BOTTO	A SLAB	BARS			₩AL	L BAF	₹S
DESIGN	THI	CKNE	ESS	A 1	BARS			J3	BARS			A2	BARS			J4	BARS			B2	2 BARS	ŝ
FILL	TS	BS	TX	SIZE	SPA.	SIZE	SPA.	C1	HT=14'	K2 HT=15'	HT=16'	SIZE	SPA.	S I ZE	SPA.	C4	HT=14'	K3 HT=151	HT=16′	SIZE	SPA.	G1
1 FT	13	14	11	7	7.5	6	7	117.8	38.0	40.4	42.8	7	7.5	6	6.5	117.8	178	190	202	5	7.5	12
2 FT	13	14	11	7	7	7	7.5	121.8	38.0	40.4	42.8	7	7	6	6.5	117.8	178	190	202	5	7	12
4 FT	12	14	11	7	6.5	6	6	117.8	37.8	40.3	42.6	7	6.5	6	6	117.8	178	190	202	5	6.5	0
6 FT	12	14	12	7	6.5	6	6	83.6	37.8	40.3	42.6	7	6.5	6	6	95.9	178	190	202	5	7	0
8 FT	12	14	13	7	6.5	7	6.5	77.9	37.8	40.3	42.6	7	6	6	6	80.0	178	190	202	5	6.5	0
10 FT	13	16	13	7	6	7	6.5	75.9	38.4	40.8	43.3	8	7.5	6	6	77.9	180	192	204	5	6.5	0
12 FT	14	17	14	7	6	7	6.5	72.1	40.8	43.3	45.8	8	7	7	8	76.3	181	193	205	5	6	0
14 FT	16	18	14	8	7	7	6.5	78.3	45.3	48.1	50.9	8	6.5	7	7	74.1	182	194	206	5	6	0
16 FT	17	19	15	8	7	7	6.5	78.6	47.8	50.6	53.5	8	6.5	7	6.5	72.5	183	195	207	6	8	0
18 FT	17	20	15	8	6.5	7	6.5	72.5	42.0	44.5	47.0	8	6	7	7.5	66.3	184	196	208	6	8	0
20 FT	19	21	15	8	6.5	7	6	72.5	50.8	53.8	56.8	8	6	7	6.5	66.3	185	197	209	6	8	0
22 FT	20	23	16	8	6	7	6	72.8	45.4	48.0	50.6	8	6	7	7	66.5	187	199	211	6	8	0
24 FT	22	24	16	8	6	7	6	72.8	52.3	55.3	58.3	9	7.5	7	6.5	66.5	188	200	212	6	8	0
26 FT	23	26	17	8	6	7	6	73.1	50.9	53.8	56.6	9	7.5	7	7	66.9	190	202	214	6	7.5	0
28 FT	24	27	18	9	7	7	6	73.5	51.4	54.3	57.1	9	7	7	7	67.3	191	203	215	6	7	0
30 FT	26	28	18	9	7	7	6	73.5	56.4	59.5	62.6	9	7	7	6.5	67.3	192	204	216	6	7	0
32 FT	27	30	19	9	7	7	6	73.9	55.0	58.0	61.0	9	7	7	7	67.5	194	206	218	6	6.5	0
34 FT	28	31	20	9	7	7	6	74.3	55.5	58.5	61.5	9	7	7	7	67.9	195	207	219	6	6.5	0
36 FT	29	32	21	9	6.5	7	6	74.5	53.8	56.6	59.5	9	6.5	7	7	68.1	196	208	220	6	6.5	0
38 FT	30	33	22	9	6.5	7	6	74.9	61.0	64.3	67.5	9	6.5	7	7	68.5	197	209	221	6	6.5	0
40 FT	31	34	22	9	6.5	7	6	74.9	61.5	64.8	68.0	9	6.5	7	7	68.5	198	210	222	6	6	0
42 FT	32	35	23	9	6.5	7	6	75.3	62.1	65.4	68.6	9	6.5	7	7	68.8	199	211	223	6	6	0
44 FT	34	36	23	9	6	7	6	75.3	65.3	68.6	72.0	9	6	7	6.5	68.8	200	212	224	7	8	0
46 FT	35	37	24	9	6	7	6	75.6	65.8	69.1	72.5	9	6	7	6.5	69.1	201	213	225	6	6	0
48 FT	36	38	24	9	6	7	6	75.6	66.4	69.8	73.1	9	6	7	7	69.1	202	214	226	7	7.5	0
50 FT	37	39	25	9	6	7	6	76.0	69.3	72.8	76.3	9	6	7	7	69.5	203	215	227	7	7.5	0



-3" CL. (J4, B2)

BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT & CULVERT.

J4 BAR-



#### ALTERNATE J3 BAR

ALIERNAIE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE
USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS
IN THE TOP SLAB IS LESS THAN 2'-O". DIMENSION L1
(NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS,
WHERE L1 IS EQUAL TO 18". 22" AND 28" FOR #4, #5
AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE
REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH
EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3
BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS
SUBSTITUTION.

				SPA	N (S	5) =	16	FT		HE I	GHT	(HT)	= 1	1 F	T OR	12 F	T OR	13 F	T			
	М	EMBE	R				TOP	SLAB E	BARS					E	зотто	VI SLAB	BARS			WAL	L BAI	₹S
DESIGN		CKN		A1	BARS			J3	BARS			A2	BARS			J4	BARS			B2	BAR:	5
FILL	TS	BS	ТХ	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	K2 HT=12'	HT=13'	SIZE	SPA.	SIZE	SPA.	C4	HT=11′	K3 HT=12′	HT=13′	SIZE	SPA.	G1
1 FT	12	14	9	7	6.5	6	6	116.6	36.8	39.6	42.5	7	7.5	6	6	116.6	142	154	166	5	8.5	12
2 FT	13	14	10	7	7	6	7	117.1	38.5	41.5	44.5	7	7.5	6	6	101.0	142	154	166	5	8.5	12
4 FT	12	13	10	7	6.5	6	6.5	72.8	36.5	39.4	42.3	7	6.5	6	6.5	74.8	141	153	165	5	8.5	0
6 FT	12	13	10	7	6	6	6	62.6	36.5	39.4	42.3	7	6	6	6	64.6	141	153	165	5	8.5	0
8 FT	12	14	10	7	6	7	6	62.6	36.8	39.6	42.5	8	7.5	6	6	60.6	142	154	166	5	8.5	0
10 FT	13	15	11	8	7.5	7	6.5	60.9	37.3	40.1	43.0	8	7	6	6.5	56.9	143	155	167	5	9	0
12 FT	14	16	11	8	6.5	7	6.5	58.9	39.3	42.3	45.3	8	6.5	6	6	54.8	144	156	168	5	8.5	0
14 FT	15	17	11	8	6	7	6	65.0	46.1	49.6	53.1	8	6	7	7	56.9	145	157	169	5	8	0
16 FT	16	19	12	8	6	7	6	65.3	40.5	43.5	46.5	8	6	6	6	53.0	147	159	171	5	8	0
18 FT	17	20	12	8	6	7	6.5	61.3	41.0	44.0	47.0	8	6	6	6.5	49.0	148	160	172	5	9	0
20 FT	19	21	12	8	6	7	6.5	59.1	43.4	46.5	49.6	8	6	6	6	49.0	149	161	173	5	7.5	0
22 FT	20	23	13	9	7.5	7	6.5	61.5	44.3	47.4	50.5	8	6	6	6.5	49.3	151	163	175	5	8	0
24 FT	22	24	13	9	7	7	6.5	59.5	46.8	50.0	53.3	9	7.5	6	6	49.3	152	164	176	5	6.5	0
26 FT	23	26	14	9	7	7	6.5	59.8	47.5	50.8	54.0	9	7.5	6	6.5	49.5	154	166	178	5	7	0
28 FT	24	27	14	9	7	7	6.5	59.8	48.0	51.3	54.5	9	7	6	6	49.5	155	167	179	5	6	0
30 FT	26	28	14	9	6.5	7	6	59.8	50.6	54.0	57.4	9	7	6	6	49.5	156	168	180	5	6	0
32 FT	27	29	15	9	6.5	7	6.5	60.0	51.3	54.6	58.0	9	7	6	6	49.6	157	169	181	5	6	0
34 FT	28	31	15	9	6.5	7	6	60.0	52.1	55.5	58.8	9	7	6	6	49.6	159	171	183	6	8	0
36 FT	29	32	16	9	6.5	7	6.5	60.4	54.5	58.0	61.5	9	6.5	6	6	49.9	160	172	184	6	8	0
38 FT	30	33	16	9	6	7	6	60.4	55.1	58.6	62.0	9	6.5	6	6	49.9	161	173	185	6	8	0
40 FT	32	34	16	9	6	7	6.5	60.4	57.9	61.5	65.1	9	6.5	6	6	49.9	162	174	186	6	8	0
42 FT	33	35	17	9	6	7	7	60.6	58.5	62.1	65.8	9	6.5	6	6	50.1	163	175	187	6	7.5	0
44 FT	34	36	17	9	6	7	7	60.6	59.1	62.8	66.3	9	6	6	6	50.1	164	176	188	6	7.5	0
46 FT	35	37	17	10	7.5	7	6.5	60.6	59.8	63.3	66.9	9	6	6	6	50.1	165	177	189	6	7.5	0
48 FT	36	38	18	10	7	7	7	60.9	60.3	63.9	67.5	9	6	6	6	52.5	166	178	190	6	7	0
50 FT	37	39	18	10	7	7	7	60.9	62.9	66.6	70.4	9	6	6	6	52.5	167	179	191	6	7	0

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE SINGLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 16 FEET HE[GHT (HT): 8 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

04/01/2011

703.17

SHEET NO. 14 OF 14

		AREA	OF ST					BARS WALL			(SQ.	IN./F	T.)			
					(	D Back	fill S	lope =	2:1							
Wall Thickness							Wa	II Hei	ght (f	+.)						
TX (in.)	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
8	0.168	0.168	0.197	0.291	0.414	0.429	0.578	0.766	1.003							
9	0.168	0.168	0.168	0.244	0.346	0.456	0.477	0.626	0.809	1.034	1.312					
10	0.168	0.168	0.168	0.211	0.298	0.407	0.487	0.532	0.683	0.864	1.084	1.349				
11	0.168		0.168													
12			0.168											1.475		
13		0.168	0.168	0.168	0.210	0.287	0.380	0.493	0.588	0.589	0.729	0.892	1.081	1.301		
14			0.168							0.623					1.390	
15				0.168	0.176	0.240	0.317	0.411	0.521	0.652	0.658	0.734	0.886	1.059	1.258	
16					0.168	0.222	0.293	0.379	0.481	0.601	0.693	0.693	0.813	0.971	1.151	
17					0.168					0.557						
18							0.255			0.520						
19										0.487						
20								0.291		0.459						
21									0.348	0.433						
22										0.411				0.870		
23														0.826		
24														0.786		
25												0.527		0.750		
26													0.604	0.717		
27														0.686	0.807	0.942

	4	AREA	OF ST				DR J5 VS.				(SQ.	IN./F	T.)			
					(	① Back	fill S	lope =	3:1							
Wall Thickness							Wa	II Hei	ght (f	+.)						
TX (in.)	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
8	0.168	0.168	0.168	0.187	0.264	0.362	0.425	0.475	0.612							
9	0.168	0.168	0.168	0.168	0.222	0.303	0.403	0.456	0.504	0.637	0.795					
10	0.168	0.168	0.168	0.168	0.191	0.261	0.346	0.450	0.487	0.541	0.671	0.824	1.005	1.217		
11	0.168	0.168	0.168	0.168	0.168	0.229	0.304	0.394	0.501	0.520	0.583	0.713	0.864	1.039		
12		0.168	0.168	0.168	0.168	0.204	0.271	0.351	0.445	0.554	0.554	0.629	0.760	0.910		
13		0.168	0.168	0.168	0.168	0.185	0.244	0.316	0.401	0.501	0.588	0.588	0.679	0.812	0.963	
14			0.168	0.168	0.168	0.168	0.223	0.288	0.365	0.455	0.560	0.623	0.623	0.733	0.868	
15				0.168	0.168	0.168	0.204	0.264	0.335	0.417	0.513	0.623	0.658	0.669	0.791	Г
16					0.168	0.168	0.189	0.244	0.309	0.385	0.474	0.575	0.690	0.693	0.727	
17					0.168	0.168	0.176	0.227	0.287	0.358	0.440	0.533	0.640	0.729	0.729	0.78
18							0.168	0.212	0.269	0.334	0.411	0.498	0.597	0.709	0.764	0.76
19								0.199	0.252	0.314	0.385	0.467	0.559	0.664	0.782	0.80
20								0.188	0.237	0.295	0.362	0.439	0.526	0.625	0.735	0.83
21									0.224	0.279	0.342	0.415	0.497	0.590	0.694	0.81
22										0.265	0.325	0.393	0.471	0.558	0.657	0.76
23											0.308	0.373	0.447	0.530	0.624	0.72
24											0.294	0.356	0.426	0.505	0.594	0.69
25												0.340	0.407	0.482	0.566	0.66
26													0.389	0.461	0.542	0.63
27														0.442	0.519	0.60

#### NOTE:

THE WALL HEIGHT IS EQUAL TO THE BARREL HEIGHT (HT) PLUS THE TOP SLAB THICKNESS (TS). WHEN WALL HEIGHT IS IN BETWEEN OR OUTSIDE TABULATED WALL HEIGHTS, THE AREA OF STEEL REQUIRED SHOULD BE INTERPOLATED BETWEEN OR EXTRAPOLATED FROM ADJACENT AREAS OF STEEL USING THE ACTUAL WALL HEIGHT.

IF AREA OF STEEL IN THE WALL OF THE CULVERT (J4 BARS) IS GREATER THAN THAT INDICATED IN THE TABLE. USE THE SAME SIZE AND SPACING FOR THE J5 BARS IN THE WINGS. HOWEVER. IF THE AREA OF STEEL PROVIDED BY MATCHING SIZE AND SPACING OF THE J4 BARS IS INSUFFICIENT. INCREASE THE SIZE OF THE J5 BARS (#8 MAX.) AND/OR DECREASE THE SPACING OF THE J5 BARS (6" MIN.). USE SMALLEST BAR SIZE POSSIBLE BASED ON MINIMUM SPACING.

MINIMUM STEEL TO BE USED IN THE WINGS FOR J5 BARS IS #4 BARS AT 14" CENTERS (AREA OF STEEL = 0.1683 SQ. IN./FT.)

 $\ensuremath{\Phi}$  SEE STANDARD PLAN 703.37C, SHEET 2 OF 2 FOR BACKFILL SLOPE TO BE USED BASED ON SKEW.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY: MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE BOX CULVERT

EXTERIOR WING REINFORCEMENT

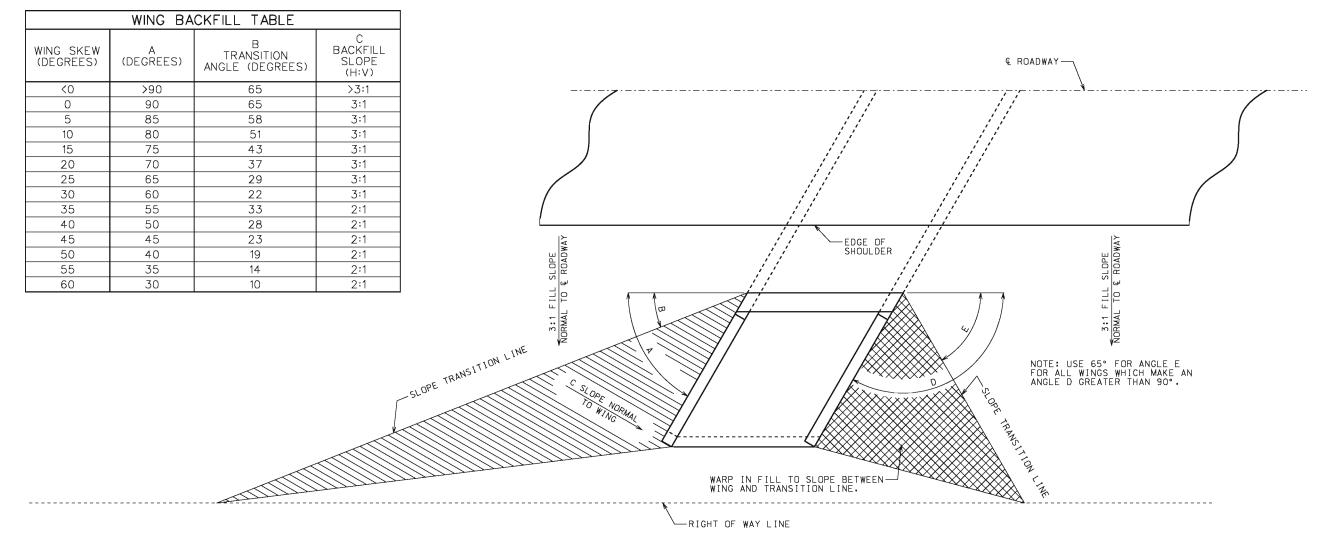
DATE EFFECTIVE: 04/01/2011 DATE PREPARED:

4/18/2011

703.37C

SHEET NO.

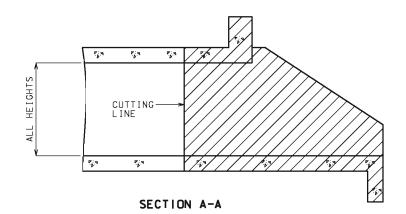
1 OF 2

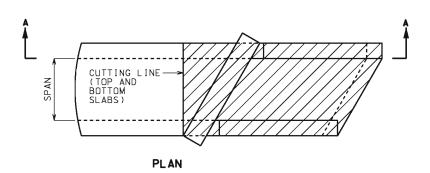


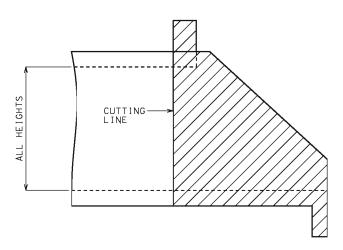
### PLAN OF WINGS AND SLOPE TRANSITION LINES

NOTE: BACKFILL TRANSITION ANGLE AND BACKFILL SLOPE SHALL APPLY TO ALL BOX CULVERTS REGARDLESS OF TYPE - SINGLE, DOUBLE, OR TRIPLE.

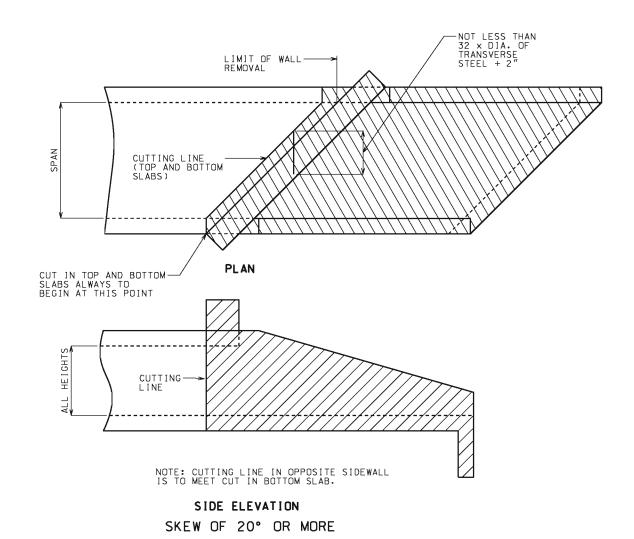








SIDE ELEVATION NO SKEW OR SKEWS LESS THAN 20°



THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED. THAT ARE BONDED IN UNDISTURBED OLD CONCRETE. SHALL BE CLEANLY STRIPPED. STRAIGHTENED. AND EXTENDED INTO NEW CONCRETE.

SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

A CONTINUOUS V-GROOVE AT LEAST 1" IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE BOX CULVERTS

CUTTING DETAILS EXTENSION TO STRAIGHT WINGS

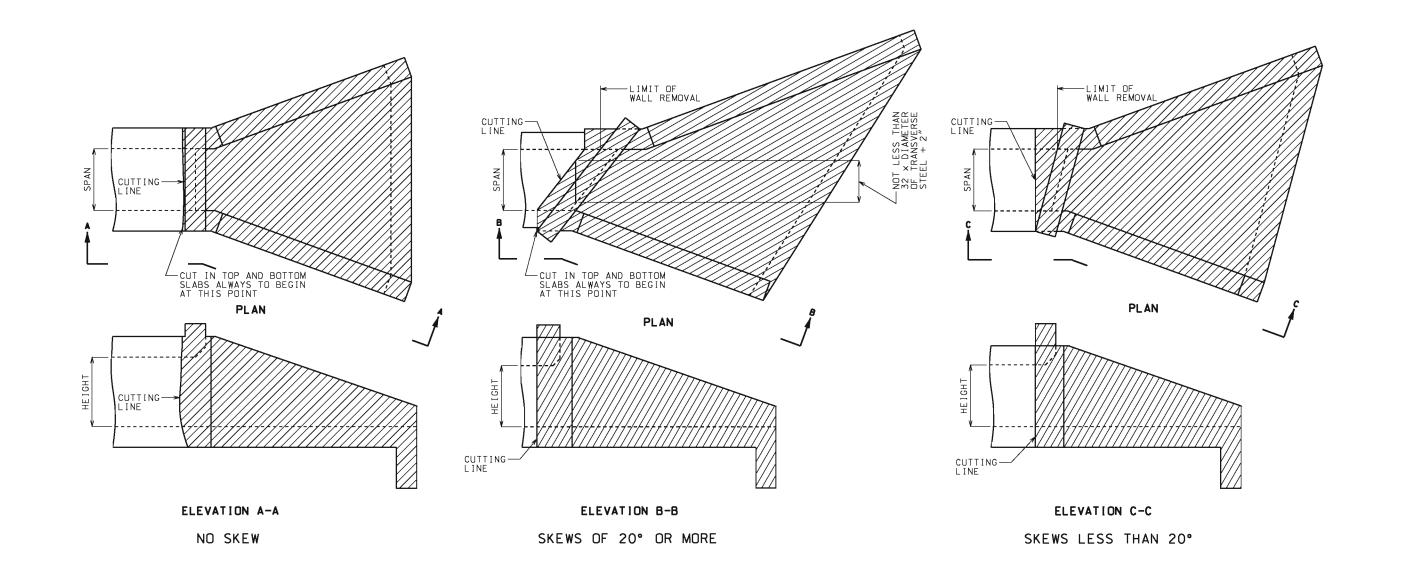
10-01-2009 8/18/2009

703.38A

SHEET NO.

DATE EFFECTIVE: DATE PREPARED:

OF 2



THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED. THAT ARE BONDED IN UNDISTURBED OLD CONCRETE. SHALL BE CLEANLY STRIPPED. STRAIGHTENED. AND EXTENDED INTO NEW CONCRETE.

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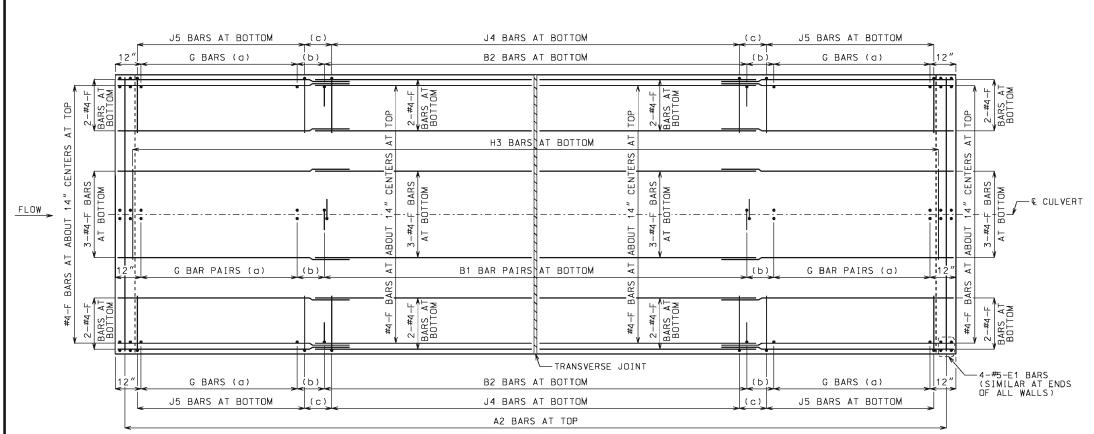
### CONCRETE BOX CULVERTS

CUTTING DETAILS EXTENSION TO FLARED WINGS

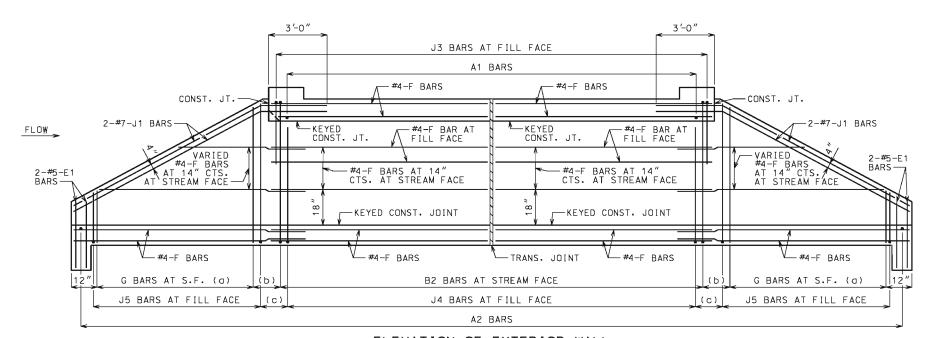
DATE EFFECTIVE: DATE PREPARED:

10-01-2009 8/18/2009

703.38A



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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### CONCRETE DOUBLE BOX CULVERT

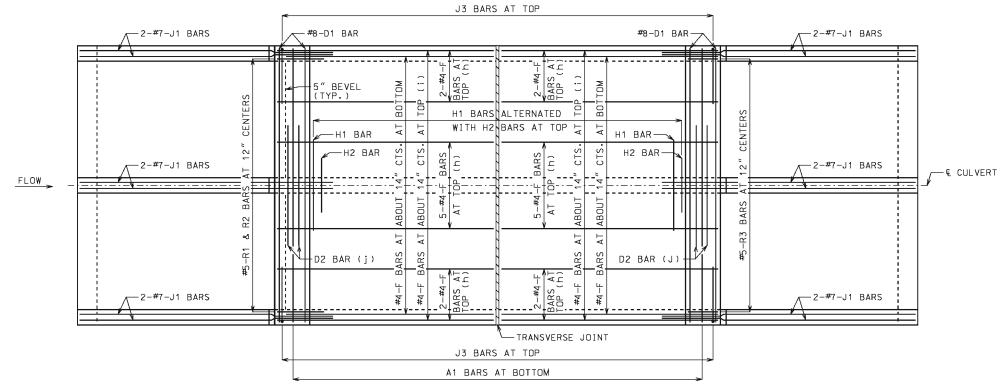
SKEW: SQUARED WINGS: STRAIGHT

REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

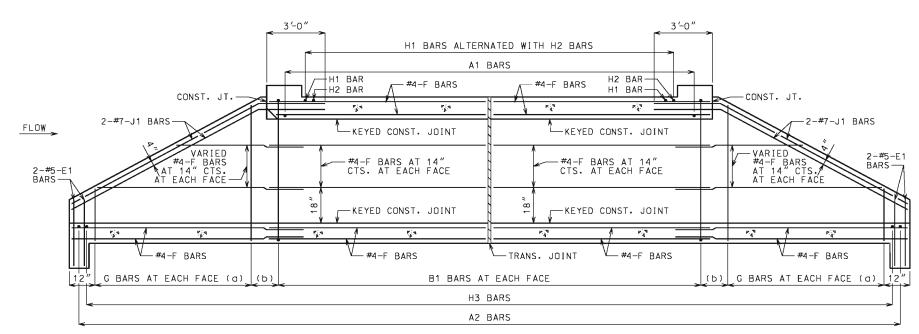
10/01/2011 5/13/2015 703.40H

SHEET NO. 1 OF 3



#### PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



## SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) NOT SPECIFIED ON THIS SHEET
- (e) NOT SPECIFIED ON THIS SHEET
- (f) NOT SPECIFIED ON THIS SHEET
- (g) NOT SPECIFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR & CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### **CONCRETE** DOUBLE BOX CULVERT

SKEW: SQUARED WINGS: STRAIGHT

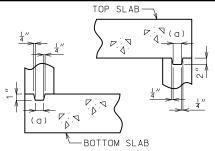
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

10/01/2011 5/13/2015

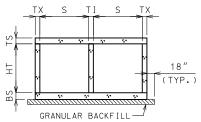
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SHEET NO. 2 OF 3

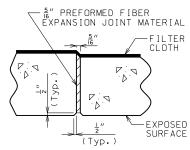


KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL

THICKNESS



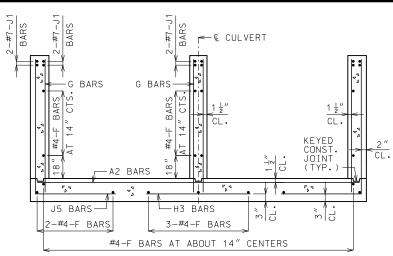
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



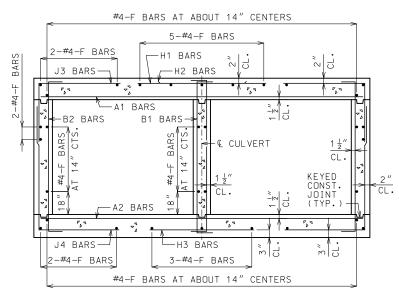
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

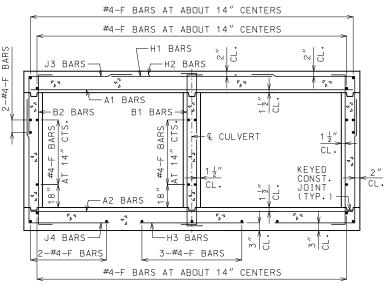
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



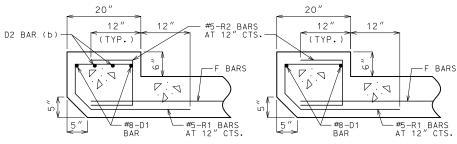
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



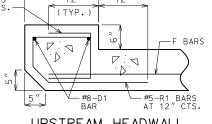
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



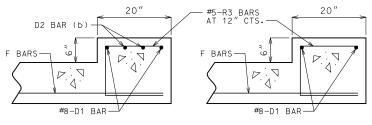
BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN



DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1  $\frac{1}{2}^{\prime\prime}$  .



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



DOUBLE BOX CULVERT

CONCRETE

SKEW: SQUARED WINGS: STRAIGHT

SECTIONS

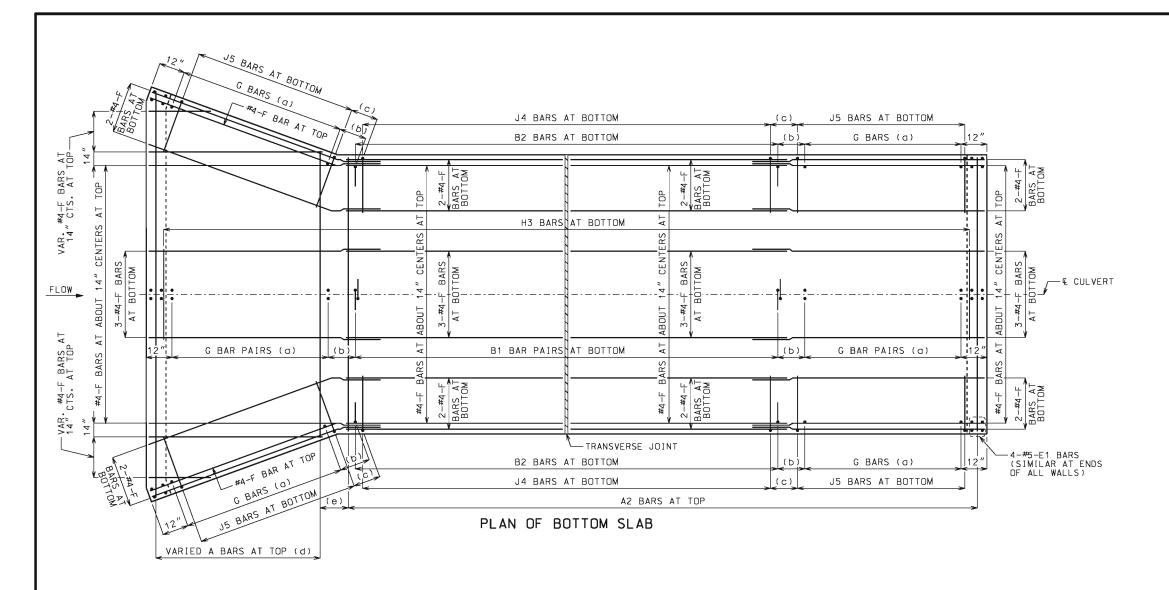
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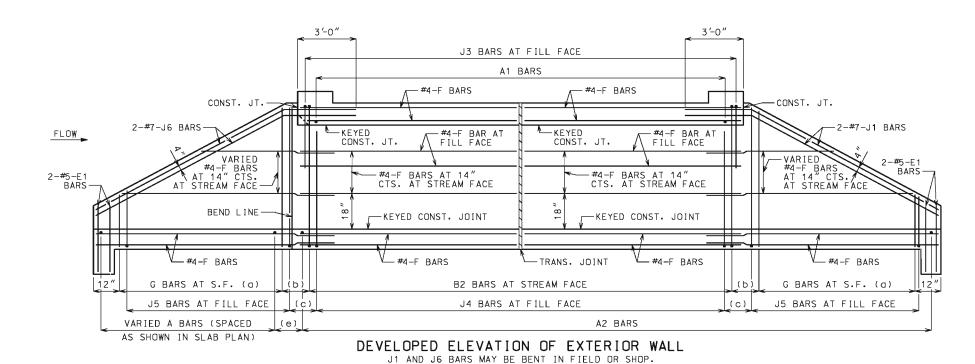
01/01/2021

703.40H

SHEET NO. 3 OF 3

(b) #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0' NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF € WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.





#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS. THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



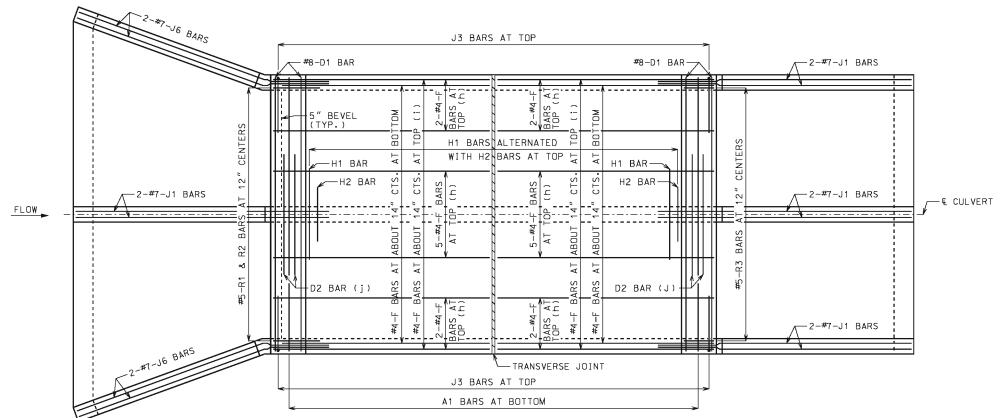
### CONCRETE DOUBLE BOX CULVERT

SKEW: SQUARED WINGS: FLARED

REINFORCEMENT

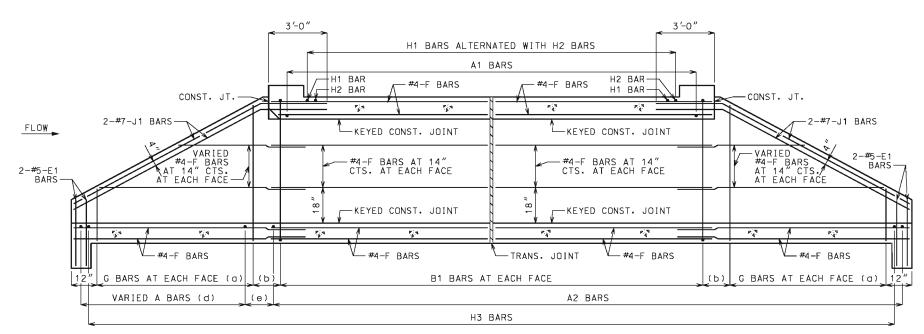
DATE EFFECTIVE: DATE PREPARED:

10/01/2011 5/13/2015 703.41H



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



## SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

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- (c) NOT SPECFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) NOT SPECFIED ON THIS SHEET
- (g) NOT SPECFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### **CONCRETE** DOUBLE BOX CULVERT

SKEW: SQUARED WINGS: FLARED

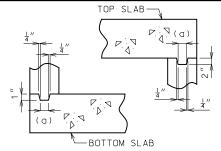
REINFORCEMENT

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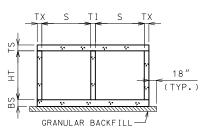
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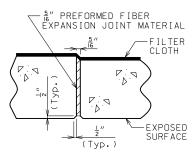
SHEET NO. 2 OF 3



KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



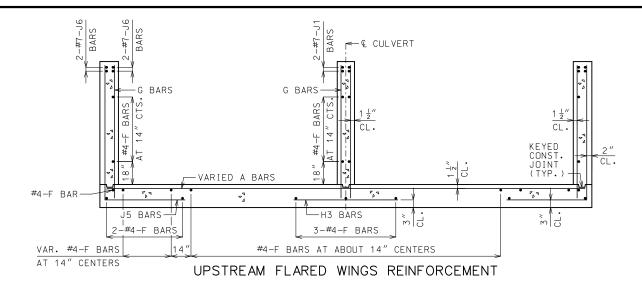
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

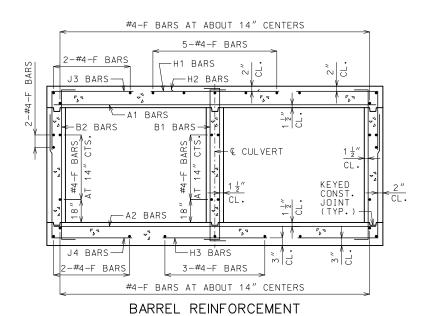


#### TRANSVERSE JOINT THRU BARREL

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FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
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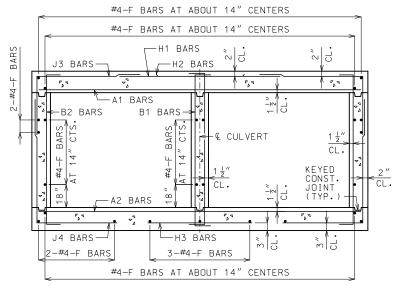




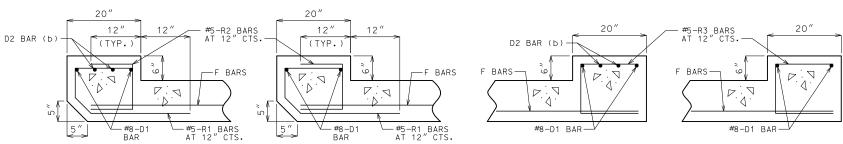
FOR DESIGN FILLS OVER 2'-0"

← © CULVERT -G BARS G BARS CL. KEYED CONST. JOINT (TYP.) -A2 BARS PA J5 BARS — НЗ BARS 2-#4-F BAR9 3-#4-F BARS #4-F BARS AT ABOUT 14" CENTERS

DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL

(b) #8 FOR CLEAR SPAN > 10'-0"

#9 FOR CLEAR SPAN > 13'-0'

NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF € WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

#### GENERAL NOTES:

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DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1  $\frac{1}{2}^{\prime\prime}$  .



#### MISSOURI HIGHWAYS AND TRANSPORTATION **COMMISSION**

CONCRETE

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



DOUBLE BOX CULVERT

SKEW: SQUARED WINGS: FLARED

SECTIONS

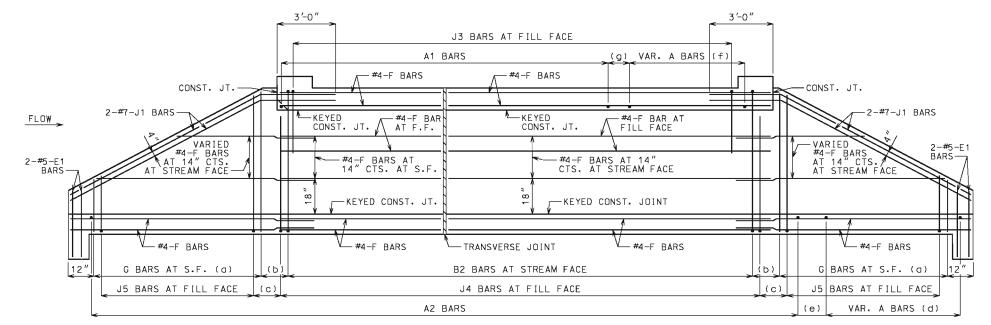
DATE EFFECTIVE: DATE PREPARED:

01/01/2021

703.41H

SHEET NO. 3 OF 3

#### J5 BARS AT BOTTOM J4 BARS AT BOTTOM (c) J5 BARS AT BOTTOM -4-#5-E1 BARS (SIMILAR AT ENDS (b) B2 BARS AT BOTTOM (b) G BARS (a) G BARS (a) VARIED 2-#4-F BARS AT BOTTOM VARIED 2-#4-F AARS AT BOTTOM H3 BARS AT BOTTOM \_\_€ CULVERT H END OF G BAR PAIRS (a) B1 BAR PAIRS AT BOTTOM (b) G BAR PAIRS WALL (TYP.) - TRANSVERSE JOINT G BARS (a) B2 BARS AT BOTTOM G BARS (a) (c) (c) J5 BARS AT BOTTOM J5 BARS AT BOTTOM J4 BARS AT BOTTOM A2 BARS AT TOP VARIED A BARS VARIED A BARS AT TOP (d) AT TOP (d) PLAN OF BOTTOM SLAB



# ELEVATION OF EXTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 ½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES. 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



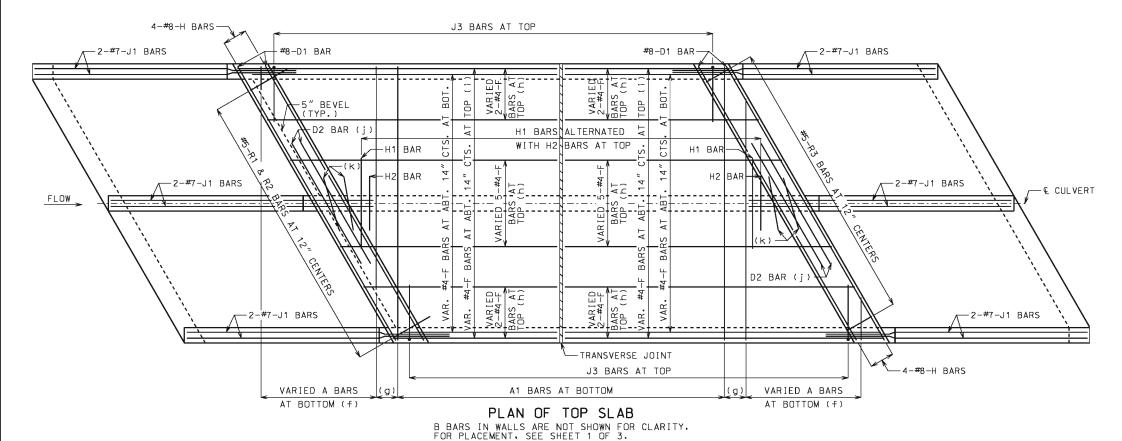
# CONCRETE DOUBLE BOX CULVERT

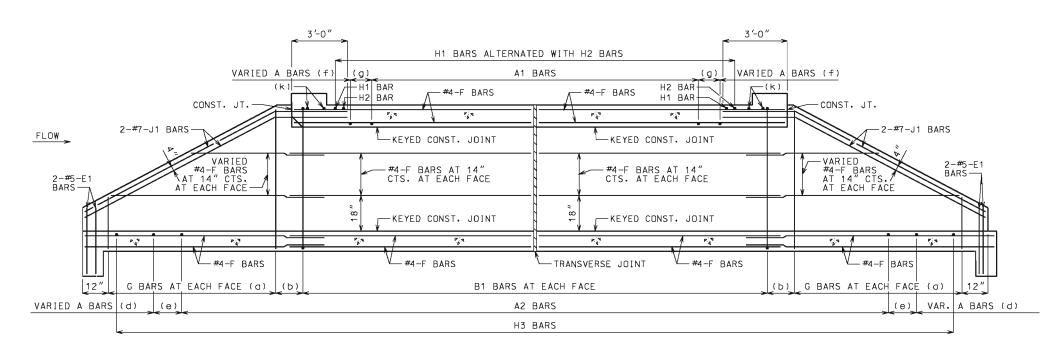
SKEW: LEFT ADVANCE WINGS: STRAIGHT

REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

10/01/2011 5/13/2015 703.42H





SECTION NEAR INTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES. SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}"$ .

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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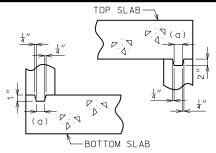
# CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: STRAIGHT

REINFORCEMENT

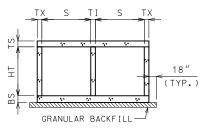
DATE EFFECTIVE: DATE PREPARED: 10/01/2011 5/13/2015

703.42H

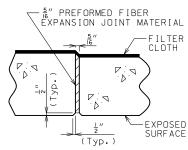


KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL

THICKNESS



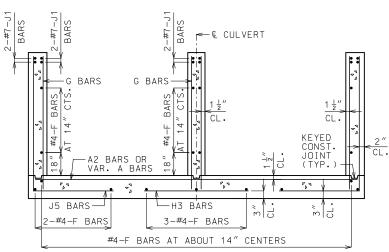
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



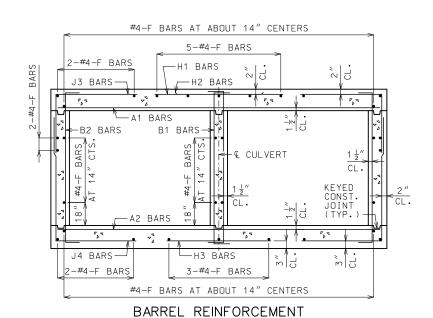
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

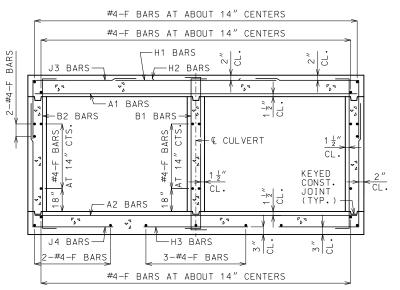
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE, FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



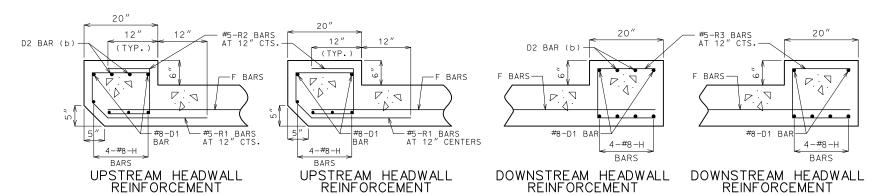
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



NEAR MIDSPAN

UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

(b) #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0' NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF © WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

NEAR MIDSPAN

NEAR INTERIOR WALL

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1  $\frac{1}{2}^{\prime\prime}$  .



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: STRAIGHT

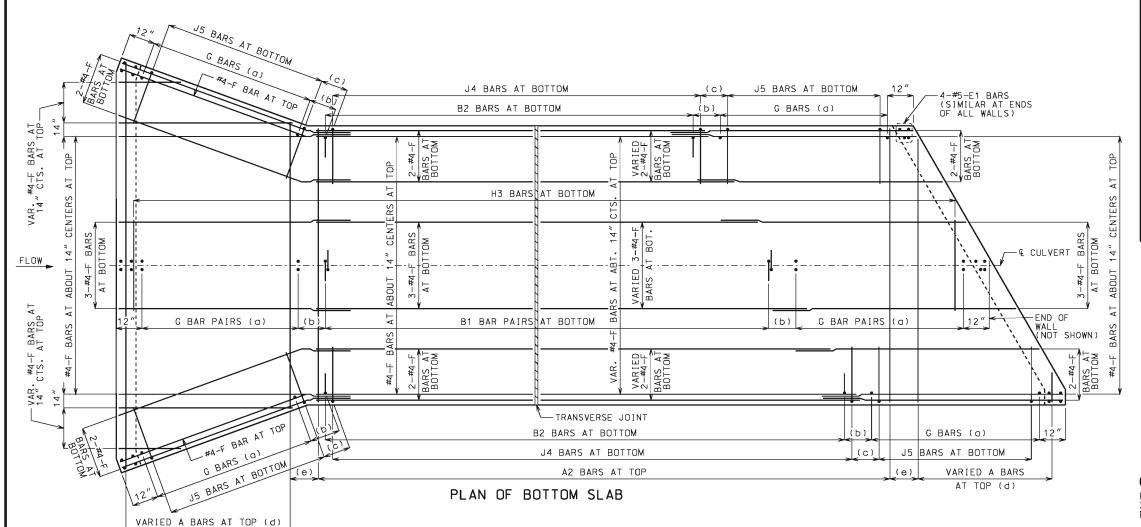
SECTIONS

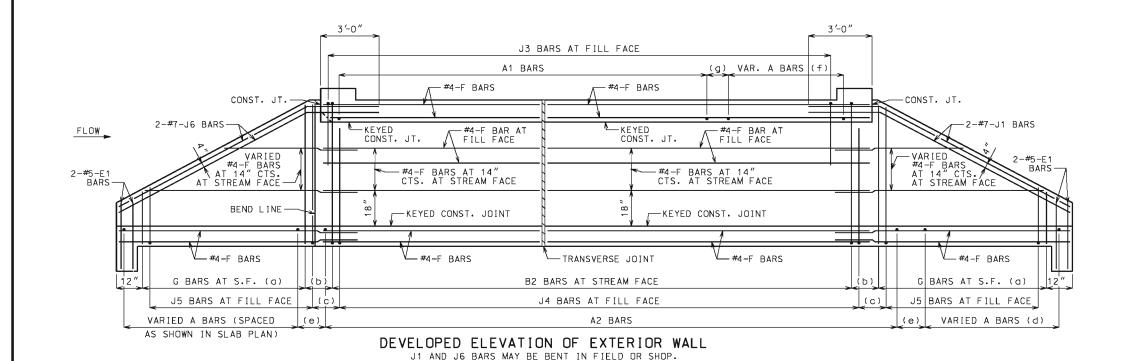
DATE EFFECTIVE: DATE PREPARED:

01/01/2021

703.42H

SHEET NO. 3 OF 3





#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVDID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 ½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES. 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



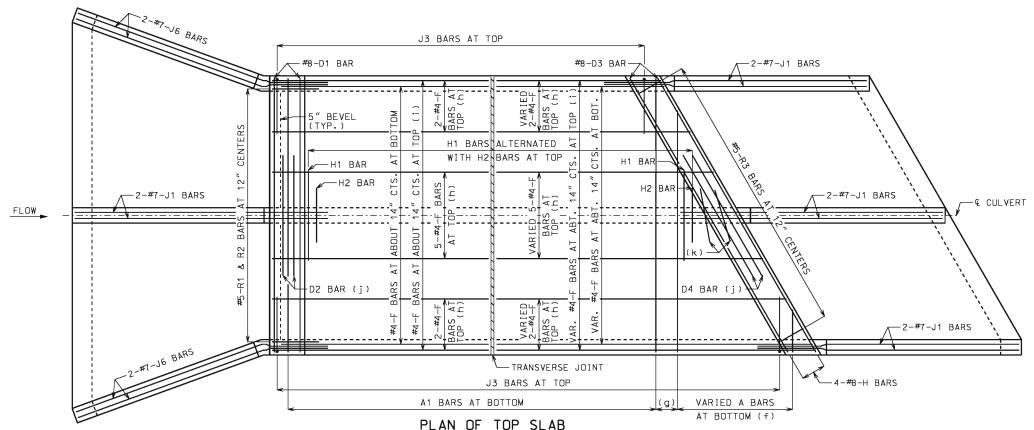
# CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: FLARED

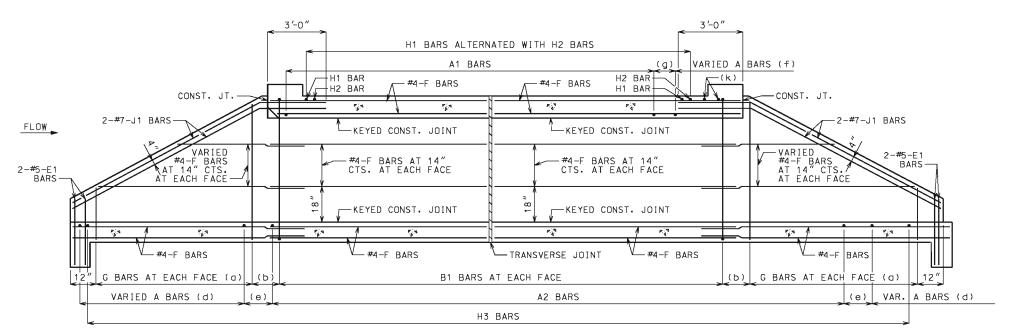
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 10/01/2011 5/13/2015

703.43H



B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



# SECTION NEAR INTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES. SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



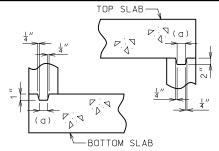
### CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: FLARED

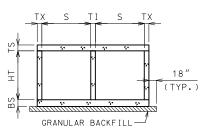
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

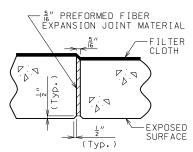
10/01/2011 5/13/2015 703.43H



KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



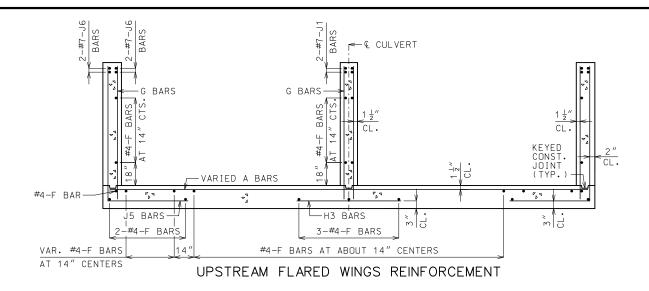
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

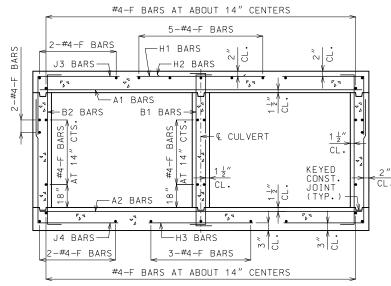


#### TRANSVERSE JOINT THRU BARREL

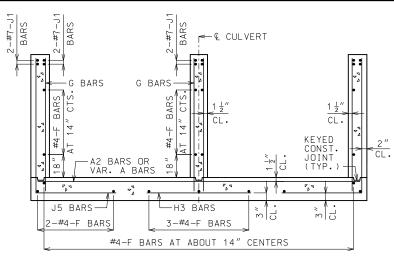
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

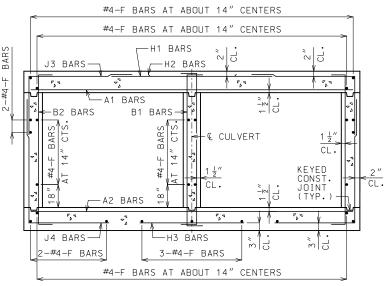




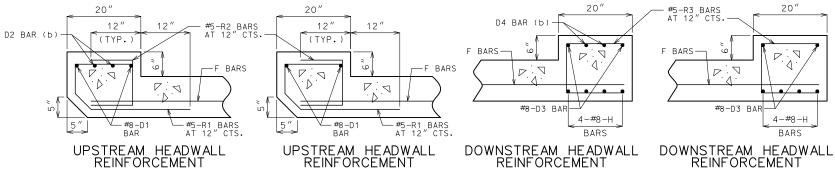
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



(b) #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0'

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF € WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ↓ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

NEAR MIDSPAN

NEAR INTERIOR WALL

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

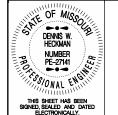
DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



#### MISSOURI HIGHWAYS AND TRANSPORTATION **COMMISSION**

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: FLARED

SECTIONS

DATE EFFECTIVE: DATE PREPARED:

01/01/2021

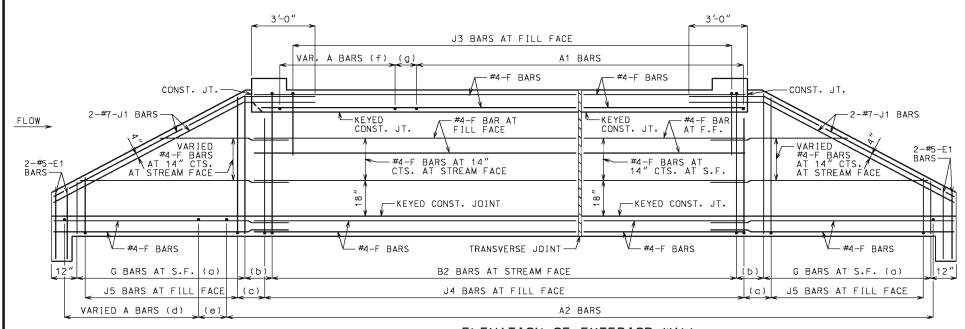
703.43H

SHEET NO. 3 OF 3

UPSTREAM HEADWALL REINFORCEMENT UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN NEAR INTERIOR WALL

NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#### J5 BARS AT BOTTOM (c) J4 BARS AT BOTTOM J5 BARS AT BOTTOM (b) (h) G BARS (a) B2 BARS AT BOTTOM G BARS (a) VARIED 2-#4-F BARS AT BOTTOM VARIED 2-#4-F AARS AT BOTTOM 2-#4-ARS 30TT0 H3 BARS AT BOTTOM FLOW END OF G BAR PAIRS (a) G BAR PAIRS (a) (b) B1 BAR PAIRS AT BOTTOM SAR (NOT SHOWN) VARIED 2-#4-F ₽₹ \_\_ |\_\_\_ TRANSVERSE JOINT -4-#5-E1 BARS (SIMILAR AT ENDS G BARS (a) B2 BARS AT BOTTOM G BARS (a) OF ALL WALLS) J5 BARS AT BOTTOM (c) J5 BARS AT BOTTOM J4 BARS AT BOTTOM VARIED A BARS A2 BARS AT TOP VARIED A BARS AT TOP (d) AT TOP (d) PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVDID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS. THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 ½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



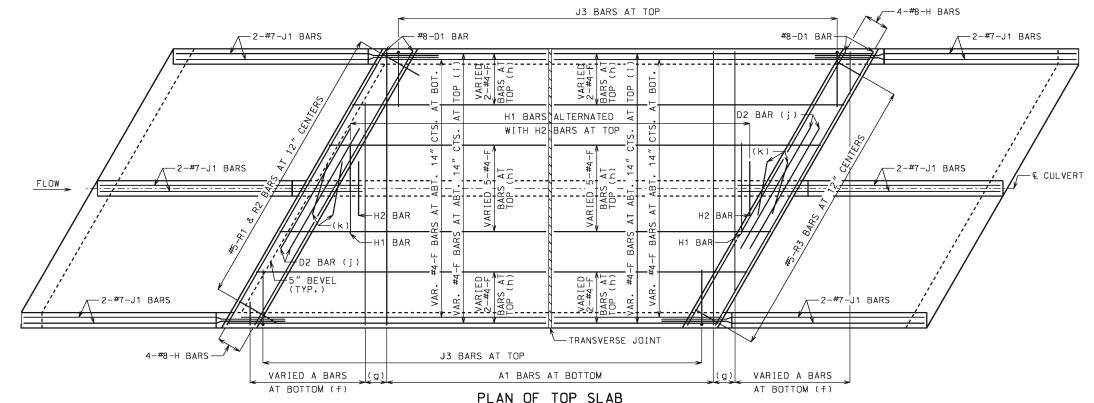
### CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: STRAIGHT

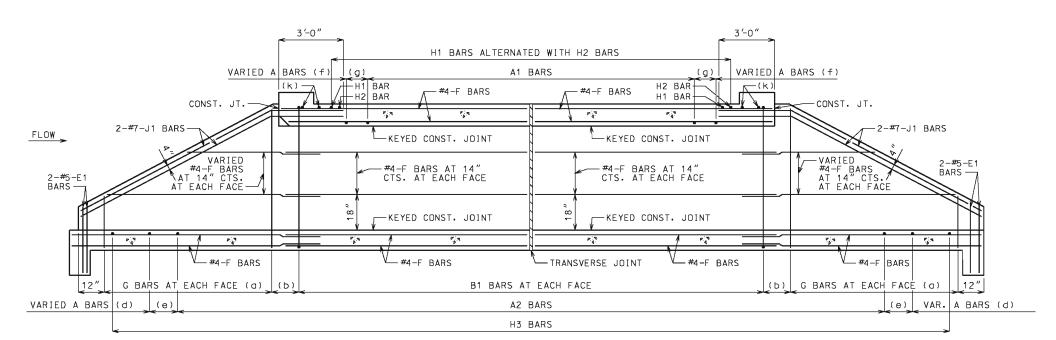
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 10/01/2011 5/13/2015 **70**:

703.44H



B BARS IN WALLS ARE NOT SHOWN FOR CLARITY. FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}"$ .

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



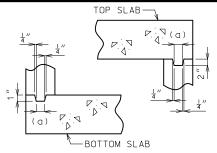
### CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: STRAIGHT

REINFORCEMENT

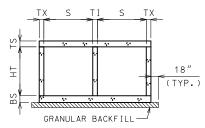
DATE EFFECTIVE: DATE PREPARED: 10/01/2011 5/13/2015

703.44H

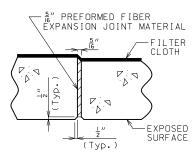


KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL

THICKNESS



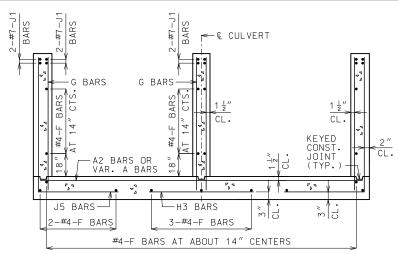
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



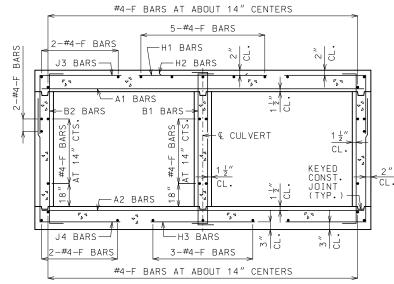
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

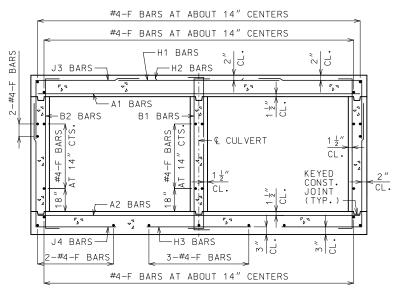
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE, FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



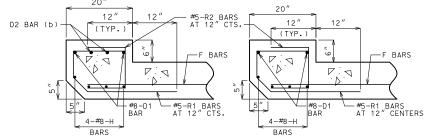
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

#5-R3 BAR9  $\triangle$ #8-D1 BAR #8-D1 BAR-4-#8-H 4-#8-H BARS

DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR \$\frac{1}{4}\$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1  $\frac{1}{2}^{\prime\prime}$  .



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: STRAIGHT

SECTIONS

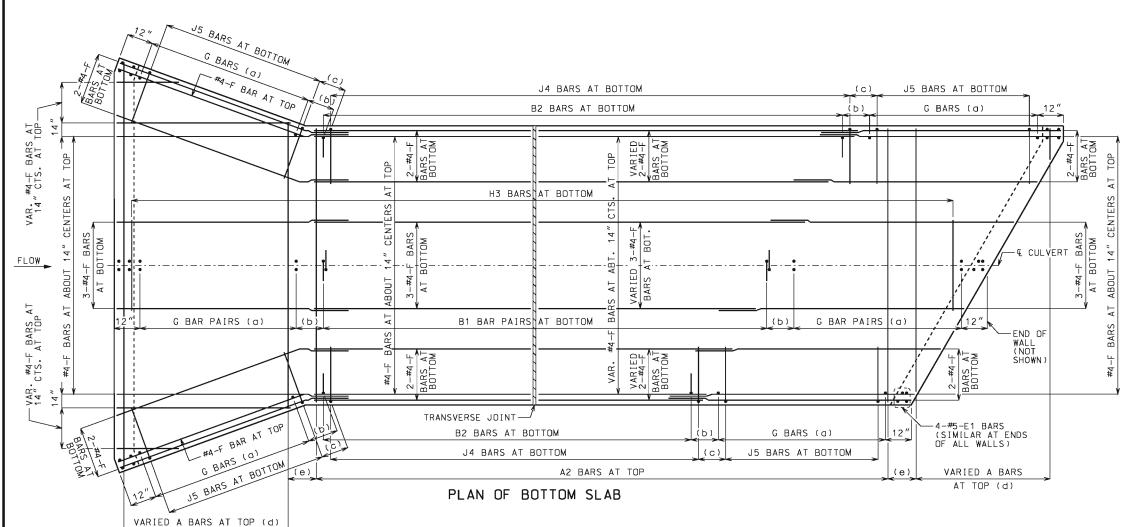
DATE EFFECTIVE: DATE PREPARED:

01/01/2021

703.44H

SHEET NO. 3 OF 3

(b) #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0 NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"



#### 3'-0" J3 BARS AT FILL FACE A1 BARS -#4-F BARS -#4-F BARS CONST. JT. CONST. JT. 2-#7-J6 BARS-2-#7-J1 BARS -#4-F BAR AT FILL FACE -KEYED CONST. JT. FLOW\_ #4-F BAF AT F.F. VARIED #4-F BARS T 14" CTS VARIED #4-F BARS BARS--#4-F BARS AT 14" CTS. AT STREAM FACE -#4-F BARS AT 14" CTS. AT S.F. 2-#5-E1 BARS-AT 14" CTS. AT STREAM FACE BEND LINE — KEYED CONST. JOINT - KEYED CONST. JT. TRANS. JOINT -- #4-F BARS #4-F BARS 12" G BARS AT S.F. (a) B2 BARS AT STREAM FACE G BARS AT S.F. (a) J5 BARS AT FILL FACE J4 BARS AT FILL FACE (c) J5 BARS AT FILL FACE VARIED A BARS (SPACED A2 BARS AS SHOWN IN SLAB PLAN)

# DEVELOPED ELEVATION OF EXTERIOR WALL J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

UITE

LAYING OUT TRANVERSE JOINTS
UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVDID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS. THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONG[TUD]NAL BARS A MINIMUM OF 23" AT SPL[CES.

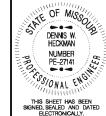
BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING



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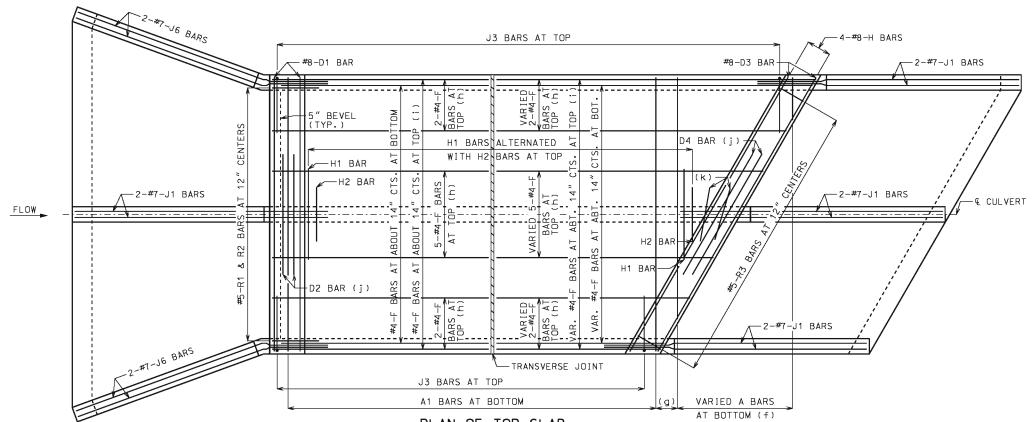
# CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: FLARED

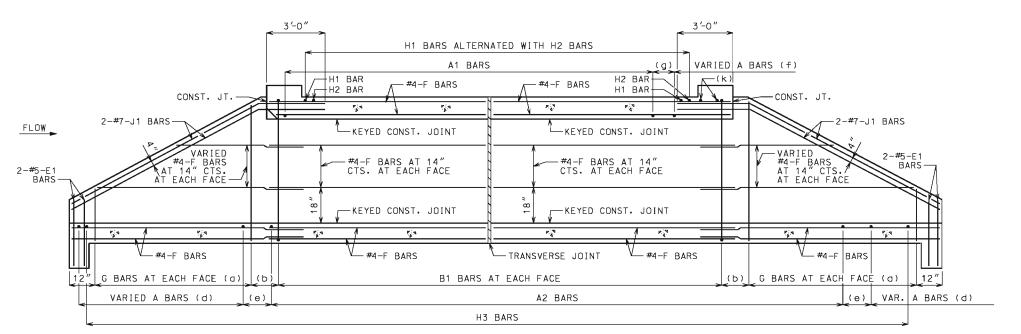
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

: <u>10/01/2011</u> : 5/13/2015 703.45C



PLAN OF TOP SLAB
B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



# SECTION NEAR INTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL. WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

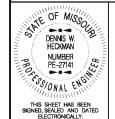
IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR  $\frac{1}{4}$  CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



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105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



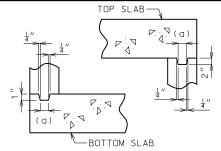
# CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: FLARED

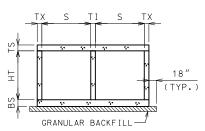
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

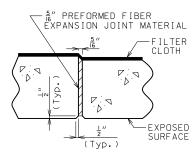
10/01/2011 5/13/2015 703.45C



KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



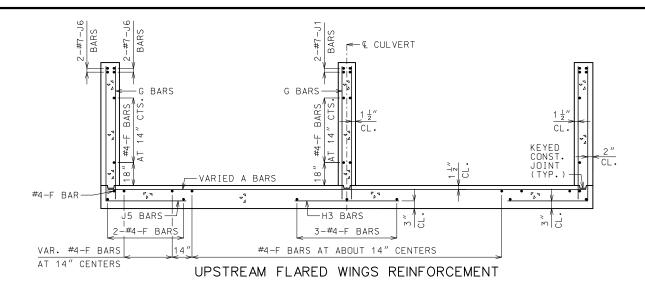
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

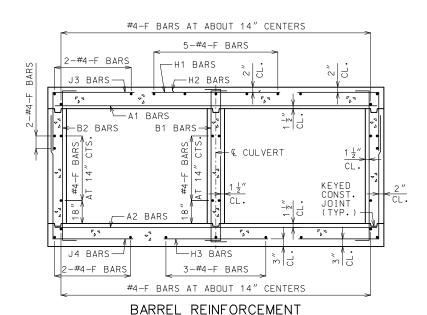


#### TRANSVERSE JOINT THRU BARREL

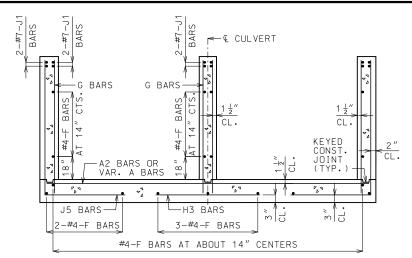
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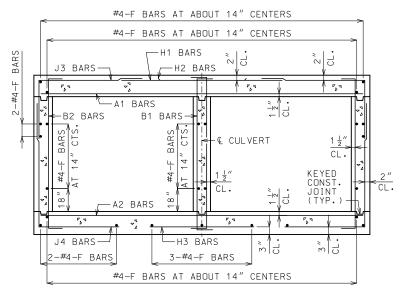




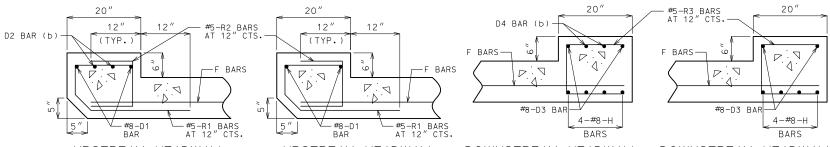
FOR DESIGN FILLS OVER 2'-0"



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF € WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ↓ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

#### GENERAL NOTES:

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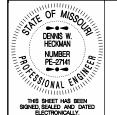
DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



#### MISSOURI HIGHWAYS AND TRANSPORTATION **COMMISSION**

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: FLARED

SECTIONS

DATE PREPARED:

01/01/2021 10/14/2020

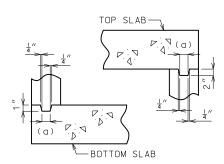
SHEET NO.

(b) #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0' NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

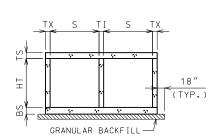
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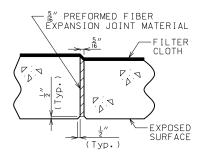
3 OF 3



KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



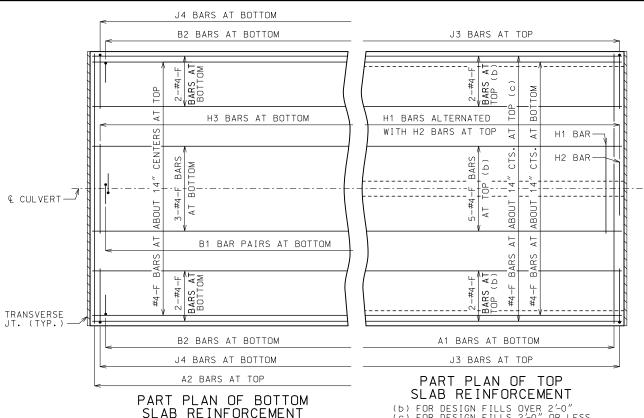
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



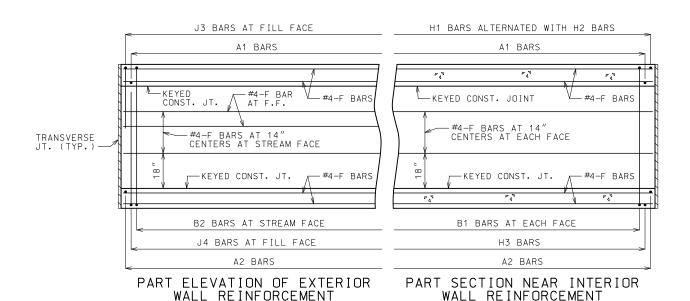
#### TRANSVERSE JOINT THRU BARREL

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FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY
THE CONTRACT UNIT PRICE FOR OTHER



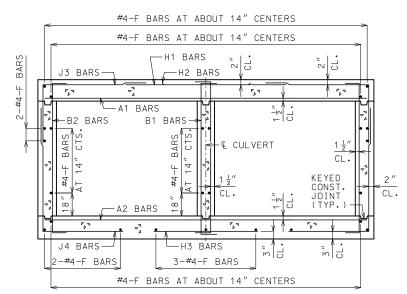
(b) FOR DESIGN FILLS OVER 2'-0" (c) FOR DESIGN FILLS 2'-0" OR LESS



#### #4-F BARS AT ABOUT 14" CENTERS 5-#4-F BARS 2-#4-F BARS J3 BARS-—H2 BARS P 9 L A1 BARS -B2 BARS B1 BARS CULVERT CL KEYED CONST. JOINT (TYP. CL. -A2 BARS J4 BARS-— H3 BARS 2-#4-F BARS 3-#4-F BARS #4-F BARS AT ABOUT 14" CENTERS

#### BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0" SYMMETRICAL ABOUT AND NORMAL TO & CULVERT.



#### BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS SYMMETRICAL ABOUT AND NORMAL TO & CULVERT.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

CUT SECTION

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: DATE PREPARED:

01/01/2021

703.46

SHEET NO. 1 OF 1

#### GENERAL NOTES

DESIGN SPECIFICATIONS: 2010 AASHTO LRFD BRIDGE DESIGN SPECFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES: CLASS B-1 CONCRETE (BOX CULVERT) f'c = 4.000 PSI REINFORCING STEEL (GRADE 60) fy = 60.000 PSI

MISCELLANEOUS: FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.47.

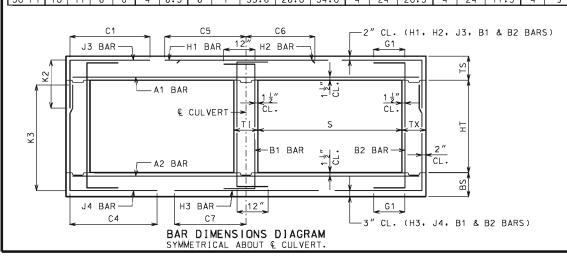
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS,

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2

										SI	PAN (	S) =	3 F	Т		HE	I GH	Г (НТ	) =	2 FT	OR	3 F	T OR	4 FT										
	Ι.	MEM									TOP SL	AB BARS	S											OM SLA	AB BAR	S					WAL			_
DESIGN		THICK	MESS	•	A1	BARS			J3	BARS				H1 B/	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1 [	BARS	B2	BARS	ف
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=2'	K2 HT=3'	HT=4′	SIZE	SPA.	C5	SIZE	SPA.	C6	S I ZE	SPA.	SIZE	SPA.	C4	HT=2'	K3 HT=3'	HT=4'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	35.3	28	40	52	4	12	24.5	5	12	5	12	12
2 FT	10	8	8	8	4	9	4	10.5	23.8	26.0	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	12	33.0	28	40	52	4	12	24.5	5	12	5	12	12
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8 FT	8	8	8	8	4	12	4	12	28.0	24.0	24.0	24.0	4	24	23.5	4	24	15.0	4	12	4	12	27.0	28	40	52	4	12	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	25.0	24.0	24.0	24.0	4	24	22.0	4	24	14.5	4	12	4	12	24.6	28	40	52	4	12	22.5	5	12	5	12	0
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20 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	17.5	4	12	4	12	24.3	28	40	52	4	9.5	22.5	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	12	4	12	24.3	28	40	52	4	9	22.5	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	12	4	12	24.3	28	40	52	4	8.5	22.5	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	12	24.5	24.0	24.0	24.0	4	24	22.0	4	24	18.0	4	11	4	11	24.3	28	40	52	4	8	22.5	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	11	24.4	24.0	24.0	24.0	4	23	22.0	4	23	18.0	4	10.5	4	10.5	24.1	28	40	52	4	7.5	22.5	5	12	5	12	0
30 FT	8	8	8	8	4	11.5	4	10.5	24.4	24.0	24.0	24.0	4	22	22.0	4	22	18.0	4	9	4	9.5	24.1	28	40	52	4	7.5	22.5	5	12	5	12	0
32 FT	8	9	8	8	4	11	4	9.5	24.5	24.0	24.0	24.0	4	21	22.0	4	21	18.0	4	10.5	4	12	24.5	29	41	53	4	8	22.5	5	12	5	12	0
34 FT	8	9	8	8	4	10.5	4	9	24.5	24.0	24.0	24.0	4	20	22.0	4	20	18.0	4	9.5	4	11.5	24.4	29	41	53	4	8	22.5	5	12	5	12	0
36 FT	8	9	8	8	4	10	4	8.5	24.4	24.0	24.0	24.0	4	19	22.0	4	19	18.0	4	9	4	11	24.4	29	41	53	4	7.5	22.5	5	12	5	12	0
38 FT	8	10	8	8	4	9.5	4	8	24.5	24.0	24.0	24.0	4	18	22.0	4	18	17.5	4	10	4	12	24.8	30	42	54	4	8.5	22.5	5	12	5	12	0
40 FT	8	10	8	8	4	9	4	7.5	24.5	24.0	24.0	24.0	4	17	22.0	4	17	17.5	4	9.5	4	12	24.8	30	42	54	4	8	22.5	5	12	5	12	0
42 FT	9	10	8	8	4	9	4	9	24.6	25.0	25.0	25.0	4	19	22.0	4	19	17.5	4	9	4	11.5	24.8	30	42	54	4	8	22.5	5	12	5	12	0
44 FT	9	10	8	8	4	9	4	8.5	24.6	25.0	25.0	25.0	4	18	22.0	4	18	17.5	4	8.5	4	11	24.8	30	42	54	4	8	22.5	5	12	5	12	0
46 FT	9	11	8	8	4	8.5	4	8	24.8	25.0	25.0	25.0	4	18	22.0	4	18	17.5	4	9	4	10.5	25.0	31	43	55	4	8.5	22.5	5	12	5	12	0
48 FT	9	11	8	8	4	8	4	7.5	24.8	25.0	25.0	25.0	4	17	22.0	4	17	17.5	4	8.5	4	10.5	25.0	31	43	55	4	8	22.5	5	12	5	12	0
50 FT	10	11	8	8	4	8.5	4	8	24.9	26.0	26.0	26.0	4	19	21.5	4	19	17.5	4	8.5	4	10.5	25.1	31	43	55	4	8	22.5	5	12	5	12	0

										SP	AN (S	5) =	3 F	T		H	EIGHT	(H	T) =	5 F	T OR	6 F1	Ī									
		MEM								TOP	SLAB	BARS									В	MOTTO	SLAB E	BARS					₩AL	LL BA	RS	
DESIGN	1	THICK	NESS	3	A1	BARS			J3 BA	.RS			H1 B <b>A</b>	.RS		H2 BA	RS	A2	BARS			J4 BAI	RS			нз ва	RS	B1	BARS	B2	2 BARS	ò
FILL	TS	BS	ТХ	ΤI	S I ZE	SPA.	SIZE	SPA.	C1		2 HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	K HT=5′	.3 HT=6′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	11.5	39.0	64	76	4	12	24.5	5	12	5	12	12
2 FT	10	8	8	8	4	8.5	4	10.5	23.8	26.0	26.0	4	24	39.5	4	24	16.0	4	12	4	11	39.9	64	76	4	11.5	24.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	23.8	24.0	24.0	4	24	39.5	4	24	15.0	4	12	4	10	38.6	64	76	4	12	23.5	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	36.9	24.0	24.0	4	24	25.0	4	24	14.5	4	12	4	9.5	36.9	64	76	4	12	23.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	38.6	24.0	24.0	4	24	23.5	4	24	15.0	4	12	4	9	35.8	64	76	4	12	23.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	33.1	24.0	24.0	4	24	21.5	4	24	14.0	4	12	4	9.5	32.8	64	76	4	12	22.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	32.8	24.0	24.0	4	24	21.5	4	24	15.0	4	12	4	9	32.5	64	76	4	12	22.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	11	32.4	24.0	24.0	4	24	21.5	4	24	16.0	4	12	4	8.5	32.3	64	76	4	12	22.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	10	32.1	24.0	24.0	4	24	21.5	4	24	16.5	4	12	4	8	32.1	64	76	4	11.5	22.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	9	32.0	24.0	24.0	4	24	21.5	4	24	17.0	4	12	4	7.5	32.0	64	76	4	11	22.5	5	12	5	12	0
20 FT	8	8	8	8	4	12	4	8	31.8	24.0	24.0	4	24	21.5	4	24	17.0	4	12	4	7	31.9	64	76	4	10	22.5	5	12	5	12	0
22 FT	8	8	8	8	4	12	4	7.5	31.6	24.0	24.0	4	24	21.5	4	24	17.5	4	12	4	6.5	31.8	64	76	4	9.5	22.5	5	12	5	12	0
24 FT	8	8	8	8	4	12	4	7	31.6	24.0	24.0	4	24	21.5	4	24	17.5	4	12	4	6	31.6	64	76	4	9.5	22.5	5	12	5	12	0
26 FT	8	8	8	8	4	12	4	6.5	31.5	24.0	24.0	4	24	21.5	4	24	17.5	4	11.5	5	6.5	31.6	64	76	4	9	22.5	5	12	5	12	0
28 FT	8	8	8	8	4	12	4	6	31.5	24.0	24.0	4	24	21.5	4	24	17.5	4	10.5	5	6	31.5	64	76	4	8.5	22.5	5	12	5	12	0
30 FT	8	9	8	8	4	12	5	6.5	31.3	24.0	28.0	4	24	21.5	4	24	17.5	4	11.5	5	6.5	32.8	65	77	4	10	22.5	5	12	5	11.5	0
32 FT	8	9	8	8	4	11	5	6	31.3	24.0	28.0	4	24	21.5	4	24	17.5	4	11	5	6	32.6	65	77	4	9.5	22.5	5	12	5	11	0
34 FT	8	9	8	8	4	10.5	_	6	31.3	24.0	28.0	4	23	21.5	4	23	17.5	4	10	5	6	32.6	65	77	4	9	22.5	5	12	5	10.5	0
36 FT	8	10	8	8	4	10	6	7.5	34.1	24.0	28.0	4	22	21.5	4	22	17.5	4	11	5	6	33.5	66	78	4	10.5	22.5	5	12	5	10	0
38 FT	8	10	8	8	4	9.5	6	7.5	34.1	24.0	28.0	4	21	21.5	4	21	17.5	4	10.5	5	6	33.5	66	78	4	10	22.5	5	12	5	9.5	
40 FT	9	10	8	8	4	10	5	6	31.9	25.0	29.0	4	24	21.0	4	24	17.5	4	10	6	1	36.4	66	78	4	9.5	22.5	5	12	5	9.5	-
42 FT	9	10	8	8	4	9.5	5	6	31.9	25.0	29.0	4	23	21.0	4	23	17.5	4	9.5	6	(	36.3	66	78	4	9	22.5	5	12	5	9.5	-
44 FT	9	10	8	8	4	9	6	1	34.9	25.0	33.0	4	22	21.0	4	22	17.5	4	9	6	6.5	36.3	66	78	4	8.5	22.5	5	12	5	9.5	
46 FT	10	11	8	8	4	9.5	5	6	32.8	26.0	30.0	4	24	20.5	4	24	17.0	4	10	6		36.9	67	79	4	9.5	22.5	5	12	5	9.5	
48 FT	10	11	8	8	4	9	6	1 7	35.8	26.0	34.0	4	24	20.5	4	24	17.5	4	9.5	6		36.9	67	79	4	9	22.5	5	12	5	9.5	0
50 FT	10	11	8	8	4	8.5	6	/	35.6	26.0	34.0	4	24	20.5	4	24	17.5	4	9	6	6.5	36.9	67	79	4	9	22.5	5	12	5	9.5	U



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 3 FEET HE[GHT (HT): 2 THRU 6 FEET

DATE EFFECTIVE: DATE PREPARED:

10/01/2011 9/8/2011

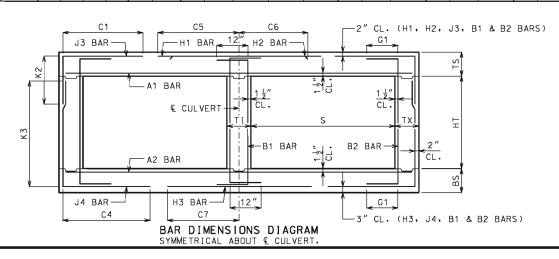
703.47

SHEET NO. 1 OF 27

COMMISSION

										SP	AN (S	;) =	4 F	T		H	IGHT	(H)	) =	2 F	T OR	3 F1	Γ									
		MEM								TOP	SLAB	BARS									E	BOTTOM	SLAB E	BARS					₩AL	L BAF	₹S	_
DESIGN	1	THICK	MES:	5	A1	BARS			J3 BA	RS			H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA	RS			НЗ ВА	RS	B1 I	BARS	B2	BARS	┙
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1		2 HT=3'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=2'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G	1
1 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	29.3	28	40	4	9.5	28.0	5	12	5	12 12	2
2 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.0	4	12	4	12	27.3	28	40	4	9	27.5	5	12	5	12 12	2]
4 FT	8	8	8	8	4	12	4	12	26.3	24.0	24.0	4	24	34.0	4	24	19.0	4	12	4	12	25.0	28	40	4	9.5	27.0	5	12	5	12 12	2]
6 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	12	24.0	28	40	4	9.5	26.5	5	12	5	12 12	2
8 FT	8	8	8	8	4	12	4	12	24.1	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	12	23.4	28	40	4	9	26.0	5	12	5	12 0	
10 FT	8	8	8	8	4	12	4	12	22.6	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	22.1	28	40	4	9	25.5	5	12	5	12 0	
12 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	22.1	28	40	4	8	25.5	5	12	5	12 0	_
14 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	22	25.5	4	22	18.5	4	12	4	12	22.1	28	40	4	7.5	25.5	5	12	5	12 0	
16 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	20	25.5	4	20	18.5	4	11	4	12	22.1	28	40	4	7	25.5	5	12	5	12 0	
18 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	18	25.5	4	18	18.5	4	10	4	11.5	22.0	28	40	4	6.5	25.5	5	12	5	12 0	_
20 FT	8	8	8	8	4	10.5	4	11.5	22.5	24.0	24.0	4	17	25.5	4	17	18.5	4	9	4	10.5	22.0	28	40	4	6	25.5	5	12	5	12 0	_
22 FT	8	9	8	8	4	10	4	10.5	22.6	24.0	24.0	4	15	25.5	4	15	18.5	4	9	4	12	21.4	29	41	4	6.5	26.0	5	12	5	12 0	_
24 FT	8	9	8	8	4	9	4	9.5	22.6	24.0	24.0	4	14	25.5	4	14	18.5	4	8.5	4	12	21.4	29	41	4	6	26.0	5	12	5	12 0	_
26 FT	8	10	8	8	4	8.5	4	8.5	22.8	24.0	24.0	4	13	25.5	4	13	18.5	4	8.5	4	12	20.9	30	42	4	6.5	26.0	5	12	5	12 0	_
28 FT	8	10	8	8	4	7.5	4	8	22.8	24.0	24.0	4	12	25.5	4	12	18.5	4	8	4	12	20.9	30	42	4	6.5	26.0	5	12	5	12 0	_
30 FT	9	10	8	8	4	8	4	10.5	22.3	25.0	25.0	4	13	25.5	4	13	18.5	4	7.5	4	12	21.0	30	42	4	6	26.0	5	12	5	12 0	_
32 FT	9	11	8	8	4	7.5	4	10	22.4	25.0	25.0	4	12	25.5	4	12	18.5	4	8	4	10.5	20.6	31	43	4	6.5	26.0	5	12	5	12 0	_
34 FT	10	11	8	8	4	7.5	4	10.5	22.0	26.0	26.0	4	13	25.0	4	13	18.5	4	7.5	4	10.5	20.9	31	43	4	6	26.0	5	12	5	12 0	_
36 FT	10	12	8	8	4	7.5	4	10	22.1	26.0	26.0	4	12	25.0	4	12	18.5	4	7.5	4	9.5	20.6	32	44	4	6.5	26.0	5	12	5	12 0	_
38 FT	10	12	8	8	4	7	4	9.5	22.1	26.0	26.0	4	12	25.0	4	12	18.5	4	7.5	4	9.5	20.6	32	44	4	6	26.0	5	12	5	12 0	_
40 FT	11	12	8	8	4	7	4	9.5	21.8	27.0	27.0	4	13	25.0	4	13	18.5	4	7	4	9.5	20.9	32	44	4	6	26.0	5	12	5	12 0	_
42 FT	11	13	8	8	4	6.5	4	9.5	21.9	27.0	27.0	4	12	25.0	4	12	18.5	4	7	4	8.5	20.6	33	45	4	6	26.0	5	12	5	12 0	_
44 FT	11	13	8	8	4	6.5	4	9	21.9	27.0	27.0	4	12	25.0	4	12	18.5	4	7	4	8.5	20.6	33	45	4	6	26.0	5	12	5	12 0	_
46 FT	12	13	8	8	4	6.5	4	8.5	21.6	28.0	28.0	4	12	24.5	4	12	18.5	4	6.5	4	8.5	20.9	33	45	5	8.5	26.0	5	12	5	12 0	_
48 FT	12	13	8	8	4	6.5	4	8.5	21.6	28.0	28.0	4	12	24.5	4	12	18.5	4	6	4	8.5	20.9	33	45	5	8.5	26.0	5	12	5	12 0	_
50 FT	12	14	8	8	4	6	4	8.5	21.8	28.0	28.0	4	12	24.5	4	12	18.5	4	6.5	4	7.5	20.8	34	46	5	9	26.0	5	12	5	12 0	┙

										SP	AN (S	S) =	4 F	T		H	EIGHT	( H	T) =	<b>4</b> F	T OR	5 F I	•									
		MEM								TOP	SLAB	BARS									В	MOTTO	SLAB E	BARS					₩AL	L BAI	RS	
DESIGN		THICK	NES:	ŝ	A1	BARS			J3 BA	RS			H1 BA	RS		H2 BA	RS	A2	BARS			J4 BAI	RS			нз ва	RS	B1	BARS	B2	BARS	,
FILL	TS	BS	ΤX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=4'		SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=4'	3 HT=5′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	39.9	52	64	4	9	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	12	36.8	52	64	4	9	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	27.3	24.0	24.0	4	24	48.0	4	24	19.5	4	12	4	12	33.8	52	64	4	9	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	33.5	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	11.5	31.3	52	64	4	9	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	30.6	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	11	29.9	52	64	4	8.5	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	12	27.4	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	12	27.1	52	64	4	9	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	27.1	24.0	24.0	4	24	25.5	4	24	18.5	4	12	4	11	26.9	52	64	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	12	27.0	24.0	24.0	4	22	25.0	4	22	18.5	4	12	4	10.5	26.8	52	64	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	11	26.9	24.0	24.0	4	21	25.0	4	21	18.5	4	10.5	4	10	26.6	52	64	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	11.5	4	10	26.8	24.0	24.0	4	19	25.0	4	19	18.5	4	9.5	4	9	26.6	52	64	4	6.5	25.5	5	12	5	12	0
20 FT	8	8	8	8	4	10.5	4	9	26.6	24.0	24.0	4	17	25.0	4	17	18.5	4	8.5	4	8	26.5	52	64	4	6	25.5	5	12	5	12	0
22 FT	8	9	8	8	4	9.5	4	8	26.8	24.0	24.0	4	15	25.0	4	15	18.5	4	9	4	9.5	26.8	53	65	4	6.5	26.0	5	12	5	12	0
24 FT	8	9	8	8	4	9	4	7.5	26.6	24.0	24.0	4	14	25.0	4	14	18.5	4	8.5	4	9	26.6	53	65	4	6.5	26.0	5	12	5	12	0
26 FT	8	10	8	8	4	8.5	4	6.5	26.6	24.0	24.0	4	13	25.0	4	13	18.5	4	8.5	4	10.5	26.9	54	66	4	7	26.0	5	12	5	12	0
28 FT	8	10	8	8	4	7.5	4	6	26.6	24.0	24.0	4	12	25.0	4	12	18.5	4	8	4	10	26.9	54	66	4	6.5	26.0	5	12	5	12	0
30 FT	9	10	8	8	4	8	4	7.5	26.8	25.0	25.0	4	13	25.0	4	13	18.5	4	7	4	9	26.9	54	66	4	6	26.0	5	12	5	12	0
32 FT	9	11	8	8	4	7.5	4	6.5	26.9	25.0	25.0	4	12	25.0	4	12	18.5	4	8	4	9	27.1	55	67	4	6.5	26.0	5	12	5	12	0
34 FT	10	11	8	8	4	7.5	4	6.5	27.0	26.0	26.0	4	14	24.5	4	14	18.5	4	7.5	4	8.5	27.1	55	67	4	6	26.0	5	12	5	12	0
36 FT	10	12	8	8	4	7.5	4	6.5	27.1	26.0	26.0	4	13	24.5	4	13	18.5	4	8	4	8.5	27.4	56	68	4	6.5	26.0	5	12	5	12	0
38 FT	10	12	8	8	4	7	4	6	27.1	26.0	26.0	4	12	24.5	4	12	18.5	4	7.5	4	8	27.4	56	68	4	6	26.0	5	12	5	12	0
40 FT	11	12	8	8	4	7	4	6	27.3	27.0	27.0	4	14	24.5	4	14	18.5	4	7	4	7.5	27.5	56	68	4	6	26.0	5	12	5	12	0
42 FT	11	13	8	8	4	7	5	9	27.3	27.0	27.0	4	13	24.5	4	13	18.5	4	7.5	4	7.5	27.8	57	69	4	6	26.0	5	12	5	12	0
44 FT	11	13	8	8	4	6.5	5	8.5	27.3	27.0	27.0	4	12	24.5	4	12	18.5	4	7	4	7.5	27.6	57	69	4	6	26.0	5	12	5	12	0
46 FT	11	13	8	8	4	6	5	8.5	27.3	27.0	27.0	4	12	24.5	4	12	18.5	4	6.5	4	7	27.6	57	69	5	9	26.0	5	12	5	12	0
48 FT	12	13	8	8	4	6.5	5	8.5	27.4	28.0	28.0	4	13	24.0	4	13	18.5	4	6.5	4	6.5	27.8	57	69	5	8.5	26.0	5	12		11.5	0
50 FT	12	14	8	8	4	6	5	8.5	27.5	28.0	28.0	4	13	23.5	4	13	18.0	4	7	4	6.5	28.0	58	70	4	6	25.5	5	12	5	11	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 4 FEET
SEALED AND DATED
SEALED AND DATED
HE [GHT (HT): 2 THRU 5 FEET

DATE EFFECTIVE: DATE PREPARED:

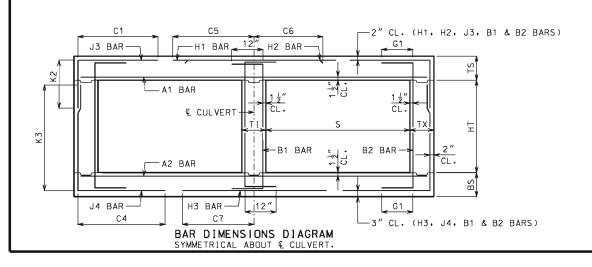
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IF A SEAL IS PRESENT ON THIS SHEE

										SP	AN (S	;) =	4 F	Т		Н	EIGHT	(H	T) =	6 F	T OR	7 F I	-									司
		MEM								TOP	SLAB	BARS									В	MOTTO	SLAB E	BARS					WAL	L BA	RS	
DESIGN		THICK	(NES	3	A1	BARS			J3 BA				H1 BA	RS		H2 BA	RS	A2	BARS			J4 BAI				нз ва	RS	B1	BARS	В2	2 BARS	3
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4		(3  HT=7'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	24	48.0	4	24	20.5	4	12	4	8.5	46.6	76	88	4	8.5	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	6.5	4	10.5	27.3	26.0	26.0	4	23	48.0	4	23	20.5	4	12	4	8.5	45.3	76	88	4	8.5	27.5	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	10.5	27.3	24.0	24.0	4	24	48.0	4	24	19.5	4	12	4	7.5	43.0	76	88	4	9	27.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10	47.3	24.0	24.0	4	24	28.5	4	24	19.0	4	12	4	7	40.8	76	88	4	9	26.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	9	41.4	24.0	24.0	4	24	27.0	4	24	19.0	4	12	4	6.5	39.0	76	88	4	8.5	26.0	5	12	5	12	0
10 FT	8	8	8	8	4	12	4	10	35.4	24.0	24.0	4	24	25.0	4	24	18.5	4	12	4	7	35.1	76	88	4	8.5	25.5	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	8.5	34.9	24.0	24.0	4	24	25.0	4	24	18.5	4	12	4	6.5	34.9	76	88	4	8	25.5	5	12	5	12	0
14 FT	8	8	8	8	4	12	4	7.5	34.6	24.0	24.0	4	23	25.0	4	23	18.5	4	12	4	6	34.6	76	88	4	7.5	25.5	5	12	5	12	0
16 FT	8	8	8	8	4	12	4	6.5	34.4	24.0	24.0	4	22	25.0	4	22	18.5	4	10.5	5	6.5	34.4	76	88	4	7	25.5	5	12	5	12	0
18 FT	8	8	8	8	4	12	4	6	34.1	24.0	24.0	4	19	25.0	4	19	18.5	4	9.5	5	6	34.3	76	88	4	6.5	25.5	5	12	5	12	0
20 FT	8	9	9	8	4	11	4	6.5	33.6	24.0	24.0	4	18	24.5	4	18	18.5	4	10	4	6.5	34.9	77	89	4	7.5	25.5	5	12	5	12	0
22 FT	8	9	9	8	4	10	4	6	33.5	24.0	24.0	4	16	25.0	4	16	18.5	4	9	4	6	34.8	77	89	4	7	25.5	5	12	5	12	0
24 FT	8	9	9	8	4	9	5	6.5	33.4	24.0	28.0	4	15	25.0	4	15	18.5	4	8.5	5	7	34.6	77	89	4	6.5	25.5	5	12	5	12	0
26 FT	8	10	9	8	4	8.5	5	6	33.1	24.0	24.0	4	14	24.5	4	14	18.5	4	9	4	6	35.5	78	90	4	7	26.0	5	12	5	11.5	0
28 FT	8	10	9	8	4	8	6	7.5	36.1	24.0	28.0	4	13	24.5	4	13	18.5	4	8.5	5	7	35.5	78	90	4	6.5	26.0	5	12	5	10.5	0
30 FT	9	10	9	8	4	8	5	6	34.0	25.0	29.0	4	14	24.5	4	14	18.5	4	7.5	5	6.5	35.3	78	90	4	6	25.5	5	12	5	10	0
32 FT	9	11	9	8	4	8	5	6	33.9	25.0	29.0	4	13	24.5	4	13	18.5	4	8	5	6.5	35.9	79	91	4	6.5	26.0	5	12	5	9.5	0
34 FT	9	11	9	8	4	7.5	5	6	33.9	25.0	29.0	4	13	24.5	4	13	18.5	4	7.5	5	6.5	35.9	79	91	4	6	26.0	5	12	5	9	0
36 FT	10	11	9	8	4	7.5	5	6.5	34.6	26.0	30.0	4	14	24.0	4	14	18.0	4	7	5	6	35.8	79	91	4	6	25.5	5	12	5	8.5	0
38 FT	10	12	9	8	4	7	5	6	34.5	26.0	30.0	4	14	24.0	4	14	18.0	4	7.5	5	6	36.3	80	92	4	6	25.5	5	12	5	8.5	0
40 FT	10	12	9	8	4	7	5	6	34.5	26.0	30.0	4	13	24.0	4	13	18.0	4	7.5	5	6	36.3	80	92	4	6	25.5	5	12	5	8.5	0
42 FT	11	12	9	8	4	7	5	6	35.1	31.0	31.0	4	14	23.5	4	14	18.0	4	6.5	6	7.5	39.1	80	92	5	9	25.5	5	12	5	8.5	0
44 FT	11	13	10	8	4	6.5	5	7	35.1	27.0	31.0	4	14	23.0	4	14	18.0	4	7.5	5	7.5	36.8	81	93	4	6	25.5	5	12	5	8	0
46 FT	11	13	10	8	4	6.5	5	6.5	35.0	27.0	31.0	4	13	23.0	4	13	18.0	4	7	5	7	36.8	81	93	5	9	26.0	5	12	5	8	0
48 FT	11	13	10	8	4	6	5	6	35.0	27.0	31.0	4	13	23.0	4	13	18.0	4	6.5	5	6.5	36.8	81	93	5	8.5	25.5	5	12	5	8	0
50 FT	12	14	11	8	4	6.5	5	7	35.6	28.0	32.0	4	15	23.0	4	15	18.0	4	7	5	7.5	37.3	82	94	5	9	26.0	5	12	5	8	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 4 FEET HE[GHT (HT): 6 THRU 7 FEET

DATE EFFECTIVE: DATE PREPARED:

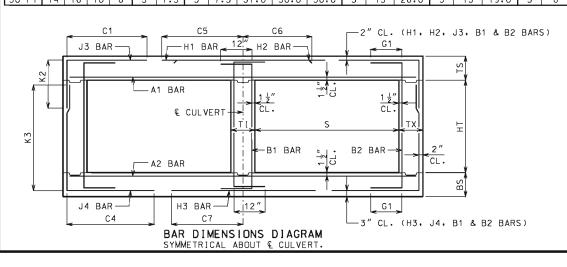
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										SP	AN (S	;) =	5 F	Т		Н	EIGHT	(H)	Γ) =	3 F	T OF	4 F1	ī									丁
		MEM		_							SLAB	BARS									E	BOTTOM		BARS						L BAF		
DESIGN	·	THICK	NES:	S	Α1	BARS			J3 BA				H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA				нз ва	RS	В1	BARS	B2	2 BARS	<u>,                                      </u>
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		2 HT=4'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=3'	.3 HT=4'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	21.5	4	12	4	12	33.3	40	52	4	7.5	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6.5	4	9.5	30.9	27.0	27.0	4	19	56.0	4	19	21.5	4	11.5	4	11.5	31.0	40	52	4	7	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	11	4	12	30.0	24.0	24.0	4	18	39.0	4	18	20.0	4	12	4	12	28.4	40	52	4	7	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	12	27.4	24.0	24.0	4	19	32.0	4	19	20.0	4	11.5	4	12	26.9	40	52	4	7	29.5	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	12	26.6	24.0	24.0	4	18	30.5	4	18	19.5	4	10.5	4	11.5	26.0	40	52	4	6.5	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	11	4	12	26.1	24.0	24.0	4	16	29.5	4	16	19.5	4	9.5	4	10.5	25.5	40	52	4	6	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	12	4	12	24.6	24.0	24.0	4	16	28.5	4	16	19.0	4	9.5	4	11	24.4	40	52	5	7.5	28.5	5	12	5	12	0
14 FT	8	8	8	8	4	10	4	11	24.6	24.0	24.0	4	14	28.5	4	14	19.0	4	8.5	4	10	24.3	40	52	5	7	28.5	5	12	5	12	0
16 FT	8	9	8	8	4	9	4	9.5	24.8	24.0	24.0	4	12	28.5	4	12	19.0	4	8.5	4	12	23.5	41	53	5	7.5	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	8	4	8.5	24.8	24.0	24.0	5	17	28.5	5	17	19.5	4	7.5	4	11.5	23.5	41	53	5	7	29.0	5	12	5	12	0
20 FT	8	10	8	8	4	7.5	4	7.5	24.9	24.0	24.0	5	17	28.0	5	17	20.0	4	7.5	4	12	22.9	42	54	5	7.5	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	9	24.3	25.0	25.0	5	16	28.5	5	16	19.0	4	7	4	12	23.1	42	54	5	7	29.0	5	12	5	12	0
24 FT	9	11	8	8	4	6.5	4	8	24.5	25.0	25.0	5	16	28.5	5	16	20.0	4	7	4	10.5	22.8	43	55	5	7.5	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	4	8.5	24.0	26.0	26.0	5	16	28.5	5	16	19.0	4	6.5	4	10.5	23.0	43	55	5	7	29.0	5	12	5	12	0
28 FT	10	12	8	8	4	6.5	4	8	24.1	26.0	26.0	5	15	28.0	5	15	19.5	4	6.5	4	9.5	22.6	44	56	5	7.5	29.0	5	12	5	12	0
30 FT	11	12	8	8	4	6.5	4	8.5	23.8	27.0	27.0	5	15	28.0	5	15	19.0	4	6	4	9.5	22.9	44	56	5	7	29.0	5	12	5	12	0
32 FT	11	13	8	8	4	6	4	7.5	23.9	27.0	27.0	5	15	28.0	5	15	19.0	4	6.5	4	8.5	22.8	45	57	5	7.5	29.0	5	12	5	12	0
34 FT	12	13	8	8	4	6	4	8.5	23.6	28.0	28.0	5	15	28.0	5	15	19.0	4	6	4	8.5	22.9	45	57	5	7	29.0	5	12	5	12	0
36 FT	12	14	8	8	5	9	4	7.5	23.8	28.0	28.0	5	15	28.0	5	15	19.0	4	6	4	7.5	22.8	46	58	5	7.5	29.0	5	12	5	12	0
38 FT	13	14	8	8	5	9	4	7.5	23.5	29.0	29.0	5	15	27.5	5	15	19.0	4	6	4	7.5	23.0	46	58	5	7	29.0	5	12	5	12	0
40 FT	13	15	8	8	5	8.5	4	7.5	23.8	29.0	29.0	5	15	27.5	5	15	19.0	4	6	4	7	22.9	47	59	5	7.5	29.0	5	12	5	12	0
42 FT	13	15	8	8	5	8	4	7	23.8	29.0	29.0	5	14	27.5	5	14	19.0	5	9	4	7	22.9	47	59	5	7	29.0	5	12	5	12	0
44 FT	14	15	8	8	5	8.5	4	7	23.5	30.0	30.0	5	15	27.0	5	15	19.0	5	8.5	4	7	23.1	47	59	5	6.5	29.0	5	12	5	12	0
46 FT	14	16	8	8	5	8	4	7	23.6	30.0	30.0	5	14	27.0	5	14	19.0	5	9	4	6.5	23.1	48	60	5	7	29.0	5	12	5	12	0
48 FT	14	16	8	8	5	7.5	4	6.5	23.6	30.0	30.0	5	14	27.0	5	14	19.0	5	8.5	4	6.5	23.1	48	60	5	6.5	29.0	5	12	5	12	0
50 FT	15	16	8	8	5	7.5	4	6.5	25.6	31.0	31.0	5	15	31.5	5	15	24.0	5	8	4	6.5	23.3	48	60	5	6.5	29.0	5	12	5	12	0

											AN (S		5 F	Т		H	EIGHT	(H	T) =	5 F												
		MEM									SLAB										Е		SLAB E	BARS					₩AL			_
ESIGN		THICK	(NES	S	A1	BARS			J3 BA	RS			H1 B4	ARS		H2 BA	ARS	A2	BARS			J4 BA	RS			нз ва	RS	B1	BARS	B2	2 BARS	S
FILL	TS	BS	TX	ΙΤ	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	12 HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZ	E SPA.	SIZE	SPA.	C4	K HT=5'	.3 HT=6'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	
1 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	11.5	4	9.5	44.1	64	76	4	7	31.0	5	12	5	12	1
2 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	19	56.0	4	19	21.5	4	10.5	4	9	40.6	64	76	4	7	31.0	5	12	5	12	T
4 FT	8	8	8	8	4	10.5	4	10.5	30.9	24.0	24.0	4	18	56.0	4	18	20.0	4	11.5	4	9	37.6	64	76	4	7	30.0	5	12	5	12	r
6 FT	8	8	8	8	4	12	4	10.5	37.1	24.0	24.0	4	19	32.0	4	19	20.0	4	11	4	8.5	34.6	64	76	4	6.5	29.5	5	12	5	12	F
8 FT	8	8	8	8	4	12	4	10	33.8	24.0	24.0	4	18	30.5	4	18	19.5	4	10	4	8	33.0	64	76	4	6	29.0	5	12	5	12	Г
IO FT	8	8	8	8	4	11	4	9	32.3	24.0	24.0	4	16	29.5	4	16	19.5	4	9	4	7.5	31.9	64	76	5	7.5	29.0	5	12	5	12	Τ
12 FT	8	8	8	8	4	11.5	4	9.5	29.5	24.0	24.0	4	16	28.5	4	16	19.0	4	9	4	7.5	29.4	64	76	5	7.5	28.5	5	12	5	12	Γ
14 FT	8	8	8	8	4	10	4	8	29.3	24.0	24.0	4	14	28.5	4	14	19.0	4	8	4	7	29.1	64	76	5	7	28.5	5	12	5	12	Τ
6 FT	8	9	8	8	4	9	4	7	29.3	24.0	24.0	4	12	28.0	4	12	19.0	4	8	4	8	29.3	65	77	5	7.5	29.0	5	12	5	12	Γ
8 FT	8	9	8	8	4	8	4	6.5	29.1	24.0	24.0	5	17	28.0	5	17	19.5	4	7	4	7.5	29.1	65	77	5	7	29.0	5	12	5	12	Γ
20 FT	8	10	8	8	4	7	5	7	29.0	24.0	24.0	5	17	28.0	5	17	20.0	4	7.5	4	8.5	29.3	66	78	5	7.5	29.0	5	12	5	12	Γ
22 FT	9	10	8	8	4	7	4	6.5	29.1	25.0	25.0	5	16	28.0	5	16	19.0	4	7	4	7.5	29.3	66	78	5	7	29.0	5	12	5	12	Γ
24 FT	9	11	8	8	4	6.5	4	6	29.1	25.0	25.0	5	16	28.0	5	16	19.5	4	7	4	7.5	29.5	67	79	5	7.5	29.0	5	12	5	12	Γ
26 FT	10	11	8	8	4	6.5	5	8	29.3	26.0	26.0	5	16	28.0	5	16	19.0	4	6.5	4	6.5	29.5	67	79	5	7.5	29.0	5	12	5	12	Γ
28 FT	10	12	8	8	4	6.5	5	7.5	29.3	26.0	26.0	5	15	28.0	5	15	19.0	4	6.5	4	6.5	29.6	68	80	5	7.5	29.0	5	12	5	12	Γ
30 FT	11	12	8	8	4	6.5	5	8.5	29.4	27.0	27.0	5	16	27.5	5	16	19.0	4	6.5	4	6	29.8	68	80	5	7.5	29.0	5	12	5	12	Γ
32 FT	11	13	8	8	4	6	5	8	29.5	27.0	27.0	5	15	27.5	5	15	19.0	4	6.5	4	6	29.9	69	81	5	7.5	29.0	5	12	5	12	
34 FT	12	13	8	8	4	6	5	8.5	29.5	28.0	32.0	5	16	27.5	5	16	19.0	4	6	5	8.5	30.0	69	81	5	7	29.0	5	12	5	11.5	
36 FT	12	14	8	8	5	9	5	7.5	29.6	28.0	32.0	5	15	27.0	5	15	19.0	4	6.5	5	9	30.1	70	82	5	7.5	29.0	5	12	5	10.5	L
38 FT	12	14	8	8	5	8.5	5	7.5	29.6	28.0	32.0	5	15	27.0	5	15	19.0	4	6	5	8.5	30.1	70	82	5	7	29.0	5	12	5	10	Ĺ
40 FT	13	14	8	8	5	8.5	5	7.5	29.6	29.0	33.0	5	16	27.0	5	16	19.0	5	8.5	5	8	30.3	70	82	5	7	29.0	5	12	5	9.5	L
42 FT	13		8	8	5	8.5	5	7	29.8	29.0	33.0	5	15	26.5	5	15	19.0	4	6	5	8	30.4	71	83	5	7	28.5	5	12	5	9.5	L
44 FT	13	15	8	8	5	8	5	6.5	29.8	29.0	33.0	5	14	26.5	5	14	19.0	5	9	5	8	30.4	71	83	5	7	28.5	5	12	5	9.5	L
46 FT	14	16	9	8	5	8	5	8	30.5	30.0	34.0	5	16	26.0	5	16	19.0	5	9	5	9	31.0	72	84	5	7	29.0	5	12	5	9.5	
48 FT	14	16	9	8	5	8	5	8	30.4	30.0	34.0	5	15	26.0	5	15	19.0	5	8.5	5	8.5	31.0	72	84	5	6.5	29.0	5	12	5	9	
50 FT	14	16	10	8	5	7.5	5	7.5	31.0	30.0	30.0	5	15	26.0	5	15	19.0	5	8	4	6	31.1	72	84	5	6.5	29.0	5	12	5	10	



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET HE [GHT (HT): 3 THRU 6 FEET

DATE EFFECTIVE: DATE PREPARED:

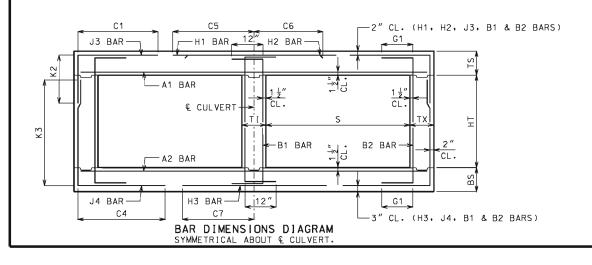
10/01/2011 9/8/2011

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4 OF 27

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

										SP	AN (S	;) =	5 F	Т		HI	E I GHT	( H.	T) =	7 F	T OR	8 F	Γ									
		MEM									SLAB										В		SLAB	BARS					WAL			
DESIGN	1	THICK	NESS	3	Α1	BARS			J3 BA	RS			H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA	RS			нз ва	RS	В1	BARS	B2	2 BARS	3
FILL	TS	BS	ΤX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	2 HT=8′	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	(3  HT=8'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9.5	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	10.5	4	7	52.1	88	100	4	7	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9	30.9	27.0	27.0	4	20	56.0	4	20	22.0	4	10	4	6.5	50.0	88	100	4	6.5	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10	4	7	30.9	24.0	24.0	4	18	56.0	4	18	20.5	4	10.5	4	6	47.4	88	100	4	6.5	30.0	5	12	5	12	12
6 FT	8	9	8	8	4	12	4	7	51.6	24.0	24.0	4	19	32.5	4	19	20.0	4	12	4	6.5	46.3	89	101	4	7.5	29.5	5	12	5	12	12
8 FT	8	9	8	8	4	12	4	6.5	44.5	24.0	24.0	4	18	30.5	4	18	19.5	4	11	4	6	44.0	89	101	4	7	29.5	5	12	5	12	0
10 FT	8	9	9	8	4	11.5	4	7	40.8	24.0	24.0	4	16	29.5	4	16	19.5	4	10	4	6.5	41.4	89	101	4	6.5	29.0	5	12	5	12	0
12 FT	8	9	9	8	4	12	4	7	36.9	24.0	24.0	4	17	28.0	4	17	19.0	4	10.5	4	7	38.3	89	101	4	6.5	29.0	5	12	5	12	0
14 FT	8	9	9	8	4	10.5	4	6.5	36.4	24.0	24.0	4	15	28.0	4	15	19.0	4	9	4	6.5	37.9	89	101	4	6	29.0	5	12	5	12	0
16 FT	8	9	9	8	4	9	5	7	36.0	24.0	28.0	4	13	28.0	4	13	19.0	4	8	5	7	37.5	89	101	5	7.5	28.5	5	12	5	12	0
18 FT	8	9	9	8	4	8	5	6	35.8	24.0	28.0	5	18	28.0	5	18	19.0	4	7.5	5	6	37.3	89	101	5	7	28.5	5	12	5	12	0
20 FT	8	10	9	8	4	7.5	6	7	38.4	24.0	28.0	5	17	28.0	5	17	19.5	4	7.5	5	6.5	38.1	90	102	5	7.5	29.0	5	12	5	11	0
22 FT	9	10	9	8	4	7.5	5	6	36.4	25.0	29.0	5	17	27.5	5	17	19.0	4	7	5	6	37.8	90	102	5	7.5	29.0	5	12	5	10	0
24 FT	9	11	9	8	4	7	5	6	36.1	25.0	29.0	5	16	27.5	5	16	19.0	4	7	5	6	38.5	91	103	5	8	29.0	5	12	5	9.5	0
26 FT	10	11	9	8	4	7	5	6	36.9	26.0	30.0	5	17	27.5	5	17	19.0	4	6.5	5	6	38.3	91	103	5	7.5	29.0	5	12	5	9	0
28 FT	10	12	9	8	4	6.5	5	6	36.8	30.0	30.0	5	16	27.5	5	16	19.0	4	7	5	6	38.9	92	104	5	8	29.0	5	12	5	8.5	0
30 FT	11	12	9	8	4	6.5	5	6	37.4	31.0	31.0	5	17	27.0	5	17	19.0	4	6.5	6	7.5	41.6	92	104	5	7.5	29.0	5	12	5	8.5	0
32 FT	11	13	9	8	4	6.5	6	7	40.3	31.0	31.0	5	16	27.0	5	16	19.0	4	6.5	5	6	39.1	93	105	5	7.5	29.0	5	12	5	8.5	0
34 FT	11	13	9	8	4	6	6	7	40.1	31.0	35.0	5	15	27.0	5	15	19.0	4	6.5	6	7	42.1	93	105	5	7.5	29.0	5	12	5	8.5	0
36 FT	12	14	10	8	4	6	5	6.5	37.8	32.0	32.0	5	17	26.0	5	17	19.0	4	6.5	5	7	39.5	94	106	5	7.5	29.0	5	12	5	8	0
38 FT	12	14	10	8	5	9	5	6	37.6	32.0	32.0	5	16	26.0	5	16	19.0	4	6	5	6.5	39.5	94	106	5	7	29.0	5	12	5	8	0
40 FT	12	15	11	8	5	8.5	5	7	37.8	28.0	32.0	5	15	26.0	5	15	19.0	4	6	5	7	40.0	95	107	5	7.5	29.0	5	12	5	7.5	0
42 FT	13	15	11	8	5	8.5	5	7	38.3	33.0	33.0	5	17	25.5	5	17	18.5	4	6	5	7	39.9	95	107	5	7	29.0	5	12	5	7.5	0
44 FT	13	15	11	8	5	8.5	5	6.5	38.1	33.0	33.0	5	16	25.5	5	16	18.5	5	9	5	7	39.9	95	107	5	6.5	29.0	5	12	5	7.5	0
46 FT	13	16	12	8	5	8	5	6.5	38.3	29.0	33.0	5	16	25.5	5	16	18.5	4	6	5	7	40.4	96	108	5	7	29.0	5	12	5	7.5	0
48 FT	14	16	12	8	5	8	5	6.5	38.8	34.0	34.0	5	17	25.0	5	17	18.5	5	9	5	6.5	40.4	96	108	5	6.5	29.0	5	12	5	7	0
50 FT	14	16	12	8	5	7.5	5	6.5	38.8	34.0	34.0	5	17	25.0	5	17	18.5	5	8.5	5	6.5	40.3	96	108	5	6.5	29.0	5	12	5	7	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 5 FEET HE[GHT (HT): 7 THRU 8 FEET

DATE EFFECTIVE: DATE PREPARED:

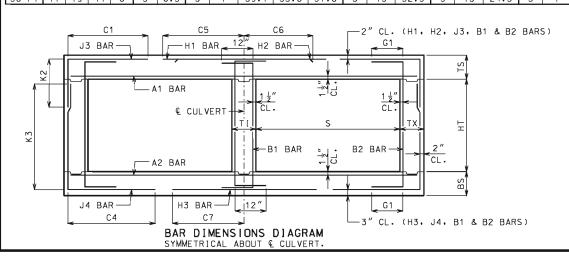
9/8/2011

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SHEET NO. 5 OF 27

													6 F	Т		HE	IGH	Г (НТ	) =	3 FT	OR	4 F		5 FT										
	Ι.	MEM									TOP SL											BOTT			WAL		_							
DESIGN		THICK	(NES	3	Α1	BARS			J3	BARS				H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	В1	BARS	В2	2 BARS	_
FILL	TS	ВЅ	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=3'	K2 HT=4'	HT=5'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=3'	K3 HT=4'	HT=5′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G	1 ا
1 FT	11	8	8	8	5	8.5	4	9.5	34.5	27.0	27.0	27.0	4	16	64.5	4	16	23.0	4	9.5	4	9.5	37.6	40	52	64	4	6	34.5	5	12	5	12 1	2
2 FT	11	8	8	8	5	8.5	4	9.5	34.5	27.0	27.0	27.0	4	15	64.5	4	15	22.5	4	9	4	9	35.0	40	52	64	5	7.5	34.0	5	12	5	12 1	2
4 FT	8	8	8	8	4	8	4	9	34.0	24.0	24.0	24.0	4	13	43.5	4	13	21.0	4	9	4	9.5	32.0	40	52	64	5	7.5	33.5	5	12	5	12 1	2
6 FT	8	8	8	8	4	9.5	4	9.5	30.4	24.0	24.0	24.0	4	13	35.5	4	13	20.5	4	8.5	4	9	29.9	40	52	64	5	7	32.5	5	12	5	12 1	2
8 FT	8	8	8	8	4	9	4	9	29.3	24.0	24.0	24.0	4	12	34.0	4	12	20.5	4	7.5	4	8	28.9	40	52	64	5	6.5	32.0	5	12	5	12 (	0
10 FT	8	9	8	8	4	8	4	8	28.8	24.0	24.0	24.0	5	17	33.0	5	17	20.5	4	7.5	4	10	27.8	41	53	65	5	7	32.0	5	12	5	12 (	0
12 FT	8	9	8	8	4	7	4	7	28.4	24.0	24.0	24.0	5	16	32.5	5	16	21.5	4	6.5	4	9	27.3	41	53	65	5	6.5	32.0	5	12	5	12 (	0
14 FT	8	9	8	8	4	7.5	4	7	27.0	24.0	24.0	24.0	5	16	31.5	5	16	21.5	4	6.6	4	9.5	25.9	41	53	65	5	6	32.0	5	12	5	12 (	0
16 FT	8	10	8	8	4	6.5	4	6	27.1	24.0	24.0	24.0	5	15	31.5	5	15	22.5	4	6.5	4	11.5	25.3	42	54	66	5	6.5	32.0	5	12	5	12 (	0
18 FT	9	11	8	8	4	6.5	4	7.5	26.6	25.0	25.0	25.0	5	16	31.5	5	16	21.5	4	6.5	4	10.5	25.0	43	55	67	5	7	32.0	5	12	5	12 (	0
20 FT	10	11	8	8	4	6	4	7.5	26.1	26.0	26.0	26.0	5	15	31.5	5	15	21.0	4	6	4	10	25.3	43	55	67	5	6.5	32.0	5	12	5	12 (	0
22 FT	10	12	8	8	5	9	4	6.5	26.3	26.0	26.0	26.0	5	15	31.5	5	15	21.5	4	6	4	9.5	24.9	44	56	68	5	6.5	32.0	5	12	5	12 (	0
24 FT	11	12	8	8	5	9	4	7	25.9	27.0	27.0	27.0	5	14	31.5	5	14	21.0	5	8.5	4	9	25.1	44	56	68	5	6	32.0	5	12	5	12 (	0
26 FT	11	13	8	8	5	8.5	4	6	26.0	27.0	27.0	27.0	5	14	31.5	5	14	21.5	5	8.5	4	8.5	24.9	45	57	69	5	6	32.0	5	12	5	12 (	0
28 FT	12	14	8	8	5	8.5	4	6.5	25.9	28.0	28.0	28.0	5	13	31.5	5	13	20.5	5	9	4	7.5	25.0	46	58	70	5	6.5	32.0	5	12	5	12 (	0
30 FT	13	14	8	8	5	8.5	4	6.5	25.6	29.0	29.0	29.0	5	12	31.0	5	12	20.0	5	8.5	4	7.5	25.1	46	58	70	5	6	32.0	5	12	5	12 (	ᇬ
32 FT	13	15	8	8	5	8	4	6	25.8	29.0	29.0	29.0	5	12	31.0	5	12	20.5	5	8.5	4	7	25.1	47	59	71	5	6	32.0	5	12	5	12 (	ᇬ
34 FT	14	15	8	8	5	8	4	6	25.5	30.0	30.0	30.0	5	12	31.0	5	12	20.0	5	8	4	7	25.3	47	59	71	6	8.5	35.0	5	12	5	12 (	ᇬ
36 FT	14	16	8	8	5	7.5	5	8.5	25.8	30.0	30.0	30.0	5	12	31.0	5	12	20.0	5	8	4	6.5	25.3	48	60	72	5	6	32.0	5	12	5	12 (	0
38 FT	15	16	8	8	5	7.5	4	6	27.5	31.0	31.0	31.0	5	12	35.5	5	12	25.0	5	7.5	4	6.5	25.4	48	60	72	6	8	35.0	5	12	5	12 (	0
40 FT	15	17	8	8	5	7	5	8	30.8	31.0	31.0	31.0	6	17	39.5	6	17	29.0	5	7.5	4	6	25.4	49	61	73	6	8.5	35.0	5	12	5	12 (	0
42 FT	16	17	8	8	5	7	5	7	30.6	32.0	32.0	32.0	5	12	35.0	5	12	25.0	5	7.5	4	6	25.6	49	61	73	6	8	35.0	5	12	5	12 (	0
44 FT	16	18	8	8	5	6.5	5	7	30.8	32.0	32.0	36.0	6	17	39.0	6	17	29.0	5	7.5	5	6.5	25.6	50	62	74	6	8	35.0	5	12	5	12 (	0
46 FT	16	18	8	8	5	6	5	7	30.8	32.0	32.0	36.0	6	16	39.0	6	16	29.0	5	7	5	6.5	25.6	50	62	74	6	8	35.0	5	12	5	11.5	0
48 FT	17	19	8	8	5	6.5	5	6.5	30.8	37.0	37.0	37.0	5	12	34.5	5	12	24.5	5	7.5	5	6.5	25.9	51	63	75	6	8	35.0	5	12	5	10.5	0
50 FT	17	19	8	8	5	6	5	6.5	30.8	37.0	37.0	37.0	6	16	38.5	6	16	28.5	5	7	5	6.5	25.9	51	63	75	6	7.5	35.0	5	12	5	10 (	0

											AN (S		6 F	Τ		H	EIGHT	(H	T) =	6 F												
		MEM		_							SLAB										Е		SLÅB E	BARS				<b>⊥</b>	₩AL			
ESIGN		THICK	(NES	S	A1	BARS			J3 BA	RS			H1 B4	ARS		H2 BA	ARS	A2	BARS			J4 BA	RS			нз ва	RS	B1	BARS	B2	2 BARS	S
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	12 HT=7'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZ	E SPA.	SIZE	SPA.	C4	K HT=6'	3 HT=7'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	
1 FT	11	8	8	8	5	8	4	9.5	34.5	27.0	27.0	4	16	64.5	4	16	23.5	4	9	4	7.5	48.9	76	88	5	7.5	34.5	5	12	5	12	1
2 FT	11	8	8	8	5	8	4	9.5	34.5	27.0	27.0	4	15	64.5	4	15	23.0	4	8.5	4	7	45.0	76	88	5	7.5	34.0	5	12	5	12	T
4 FT	8	8	8	8	4	7.5	4	7.5	34.5	24.0	24.0	4	13	64.5	4	13	21.0	4	8.5	4	7	41.6	76	88	5	7	33.5	5	12	5	12	F
6 FT	8	8	8	8	4	9	4	7.5	40.9	24.0	24.0	4	13	36.0	4	13	20.5	4	8	4	6.5	38.1	76	88	5	7	32.5	5	12	5	12	F
8 FT	8	8	8	8	4	9	4	7	37.0	24.0	24.0	4	12	34.0	4	12	20.5	4	7.5	4	6	36.3	76	88	5	6.5	32.0	5	12	5	12	Г
IO FT	8	9	8	8	4	8	4	6	35.1	24.0	24.0	5	17	33.0	5	17	21.0	4	7.5	4	6.5	35.5	77	89	5	7	32.0	5	12	5	12	Τ
12 FT	8	9	8	8	4	7	5	6.5	34.1	24.0	24.0	5	16	32.5	5	16	21.5	4	6.5	4	6	34.5	77	89	5	6.5	32.0	5	12	5	12	Γ
14 FT	8	9	8	8	4	7	5	6.5	31.8	24.0	24.0	5	16	31.5	5	16	21.5	4	6.5	4	6	32.0	77	89	5	6	32.0	5	12	5	12	T
6 FT	8	10	8	8	4	6.5	5	6	31.6	24.0	24.0	5	15	31.0	5	15	22.5	4	6.5	4	7	32.0	78	90	5	6.5	32.0	5	12	5	12	Γ
8 FT	9	11	8	8	4	6.5	5	6.5	31.8	25.0	25.0	5	16	31.0	5	16	21.5	4	6.5	4	6.5	32.3	79	91	5	7	32.0	5	12	5	12	T
20 FT	10	11	8	8	4	6	5	7.5	31.8	26.0	30.0	5	15	31.0	5	15	21.0	4	6	5	7.5	32.1	79	91	5	6.5	32.0	5	12	5	12	T
22 FT	10	12	8	8	5	9	5	7	31.6	26.0	30.0	5	15	31.0	5	15	21.5	4	6	5	8	32.3	80	92	5	6.5	32.0	5	12	5	12	Γ
24 FT	11	12	8	8	5	9	5	7.5	31.8	27.0	31.0	5	14	31.0	5	14	20.5	5	8.5	5	7.5	32.1	80	92	5	6	32.0	5	12	5	12	Γ
26 FT	11	13	8	8	5	8.5	5	6.5	31.8	27.0	31.0	5	14	31.0	5	14	21.0	5	9	5	7.5	32.3	81	93	5	6	32.0	5	12	5	11	Τ
28 FT	12	14	8	8	5	8.5	5	7	31.9	28.0	32.0	5	13	30.5	5	13	20.0	5	9	5	8	32.6	82	94	5	6.5	32.0	5	12	5	10	Γ
30 FT	12	14	8	8	5	7.5	5	6.5	31.8	28.0	32.0	5	13	30.5	5	13	20.5	5	8.5	5	7.5	32.5	82	94	5	6	32.0	5	12	5	9.5	Γ
32 FT	13	15	8	8	5	8	5	6.5	32.0	29.0	33.0	5	12	30.0	5	12	20.0	5	8.5	5	7.5	32.8	83	95	5	6	32.0	5	12	5	9.5	Г
34 FT	13	15	8	8	5	7	5	6	31.9	29.0	33.0	5	12	30.0	5	12	20.0	5	8	5	7	32.8	83	95	5	6	32.0	5	12	5	9.5	
36 FT	14	16	9	8	5	7.5	5	7.5	32.6	30.0	34.0	5	12	29.5	5	12	19.5	5	8	5	8	33.3	84	96	5	6	32.0	5	12	5	9	
38 FT	14	16	9	8	5	7	5	7	32.5	30.0	34.0	5	12	29.5	5	12	19.5	5	8	5	8	33.1	84	96	6	8	35.0	5	12	5	8.5	Γ
40 FT	15	17	9	8	5	7	5	6.5	37.8	31.0	35.0	5	13	34.0	5	13	24.5	5	8	5	8	33.5	85	97	6	8.5	35.0	5	12	5	8.5	Ĺ
42 FT	15	17	10	8	5	7	5	7.5	38.3	31.0	35.0	5	12	34.0	5	12	24.5	5	7.5	5	7.5	33.6	85	97	6	8	35.0	5	12	5	9	
44 FT	15	18	10	8	5	6	5	7	38.4	31.0	35.0	5	12	34.0	5	12	24.5	5	7.5	5	7.5	33.9	86	98	6	8	35.0	5	12	5	8.5	Ĺ
46 FT	16	18	10	8	5	6.5	5	6.5	38.4	32.0	36.0	5	12	33.0	5	12	24.5	5	7.5	5	7.5	34.0	86	98	6	7.5	35.0	5	12	5	8	
48 FT	16		11	8	5	6.5	5	7	39.0	32.0	36.0	5	12	33.0	5	12	24.5	5	7.5	5	8.5	34.4	87	99	6	8	35.0	5	12	5	8.5	I
50 FT	17	19	11	8	5	6.5	5	7	39.1	33.0	37.0	5	13	32.5	5	13	24.5	5	7	5	8	34.5	87	99	6	7.5	35.0	5	12	5	8	Г



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 6 FEET
HIS SKEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.
HE [GHT (HT): 3 THRU 7 FEET

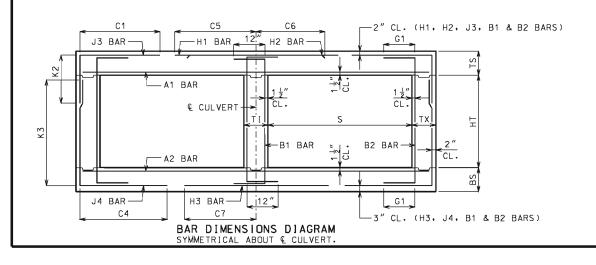
DATE EFFECTIVE: DATE PREPARED:

: 10/01/2011 : 9/8/2011 703.47

SHEET NO. 6 OF 27

B. B.

										SP.	AN (S	;) =	6 F	Т		Н	EIGHT	(H.	T) =	8 F	T OR	9 F1	7									司
		MEM								TOP	SLAB	BARS									Е	MOTTO	SLAB I	BARS					WAL	L BA	RS	
DESIGN		THICK	NESS	3	Α1	BARS			J3 BA	RS			H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA				НЗ ВА	RS	В1	BARS	B2	2 BARS	5
FILL	TS	BS	ΤX	ΤI	SIZE	SPA.	S I ZE	SPA.	C1	HT=8'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4		(3  HT=9'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	9	8	8	5	8	4	7	34.5	27.0	27.0	4	16	64.5	4	16	23.5	4	9.5	4	6.5	59.4	101	113	4	6.5	34.5	5	12	5	12	12
2 FT	11	9	8	8	5	8	4	6.5	34.5	27.0	27.0	4	16	64.5	4	16	23.0	4	9	4	6	57.0	101	113	4	6	34.0	5	12	5	12	12
4 FT	8	9	9	8	4	7.5	4	6.5	35.1	24.0	24.0	4	13	65.0	4	13	21.0	4	9.5	4	6.5	53.0	101	113	4	6	33.5	5	12	5	12	12
6 FT	8	9	9	8	4	9	4	6	53.1	24.0	24.0	4	13	36.0	4	13	20.5	4	9	4	6	49.5	101	113	4	6	33.0	5	12	5	12	12
8 FT	8	9	9	8	4	9	5	7	46.5	24.0	28.0	4	12	33.5	4	12	20.5	4	8	5	6.5	46.5	101	113	5	7.5	32.5	5	12	5	12	0
10 FT	8	9	9	8	4	8	5	6	43.8	24.0	28.0	5	17	32.5	5	17	20.5	4	7.5	5	6	44.6	101	113	5	6.5	32.0	5	12	5	11.5	0
12 FT	8	9	10	8	4	7.5	5	6.5	41.8	24.0	28.0	5	17	32.0	5	17	21.5	4	6.5	5	6.5	42.9	101	113	5	6.5	32.0	5	12	5	11.5	0
14 FT	8	9	10	8	4	7.5	5	6.5	38.5	24.0	28.0	5	17	31.0	5	17	21.0	4	6.5	5	6.5	39.6	101	113	5	6	31.5	5	12	5	12	0
16 FT	8	10	10	8	4	6.5	5	6	38.1	24.0	28.0	5	16	31.0	5	16	22.0	4	6.5	5	7	40.6	102	114	5	6.5	32.0	5	12	5	11.5	0
18 FT	9	11	10	8	4	6.5	5	6	38.8	25.0	29.0	5	16	31.0	5	16	21.0	4	6.5	5	7	41.1	103	115	5	7	32.0	5	12	5	10.5	0
20 FT	9	11	10	8	4	6	5	6	38.5	25.0	29.0	5	16	31.0	5	16	22.0	4	6	5	6.5	40.9	103	115	5	6	32.0	5	12	5	10	0
22 FT	10	12	10	8	4	6	5	6.5	39.1	30.0	30.0	5	15	30.5	5	15	21.0	4	6	5	6.5	41.4	104	116	5	6.5	32.0	5	12	5	9	0
24 FT	11	13	10	8	4	6	5	6.5	39.6	31.0	31.0	5	14	30.5	5	14	20.0	4	6	5	6.5	41.8	105	117	5	6.5	32.0	5	12	5	8.5	0
26 FT	11	13	10	8	5	9	5	6	39.4	31.0	31.0	5	14	30.5	5	14	20.5	5	9	5	6.5	41.6	105	117	5	6	32.0	5	12	5	8	0
28 FT	12	14	10	8	5	9	5	6	40.0	32.0	32.0	5	13	30.0	5	13	19.5	4	6	5	6.5	42.0	106	118	5	6.5	32.0	5	12	5	8	0
30 FT	12	14	10	8	5	8	5	6	39.9	32.0	32.0	5	13	30.0	5	13	20.0	5	8.5	5	6	41.9	106	118	5	6	32.0	5	12	5	8	0
32 FT	13	15	11	8	5	8.5	5	7	40.4	33.0	33.0	5	13	29.0	5	13	19.5	5	8.5	5	7	42.3	107	119	5	6	32.0	5	12	5	7.5	0
34 FT	13	15	11	8	5	8	5	6.5	40.3	33.0	33.0	5	13	29.0	5	13	19.5	5	8	5	7	42.1	107	119	6	8	35.0	5	12	5	7.5	0
36 FT	14	16	11	8	5	8	5	6	40.8	34.0	34.0	5	14	28.5	5	14	19.5	5	8.5	5	7	42.6	108	120	5	6	32.0	5	12	5	7.5	0
38 FT	14	16	12	8	5	7.5	5	6.5	40.8	34.0	34.0	5	13	28.5	5	13	19.5	5	7.5	5	6.5	42.5	108	120	6	8	35.0	5	12	5	7	0
40 FT	14	17	12	8	5	7	5	6	40.8	34.0	34.0	5	12	28.5	5	12	19.5	5	8	5	6.5	43.0	109	121	6	8	35.0	5	12	5	7	0
42 FT	15	17	13	8	5	7	5	6	46.4	35.0	35.0	5	13	33.0	5	13	24.5	5	7	5	6	42.8	109	121	6	7.5	35.0	5	12	5	7	0
44 FT	15	18	13	8	5	7	5	6	46.4	35.0	35.0	5	13	33.0	5	13	24.5	5	7.5	5	6	43.3	110	122	6	8	35.0	5	12	5	6.5	0
46 FT	15	18	13	8	5	6	5	6	46.3	35.0	35.0	5	12	33.0	5	12	24.5	5	7.5	5	6	43.3	110	122	6	7.5	35.0	5	12	5	6.5	0
48 FT	16	19	14	8	5	6.5	5	6	47.0	36.0	36.0	5	14	32.5	5	14	24.0	5	7.5	5	6	43.8	111	123	6	7.5	35.0	5	12	5	6.5	0
50 FT	16	19	14	8	5	6	5	6	46.9	36.0	36.0	5	13	32.5	5	13	24.0	5	7	5	6	43.6	111	123	6	7.5	35.0	5	12	5	6.5	0



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## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 6 FEET
HE IGHT (HT): 8 THRU 9 FEET

DATE EFFECTIVE: DATE PREPARED:

: 10/01/2011 : 9/8/2011

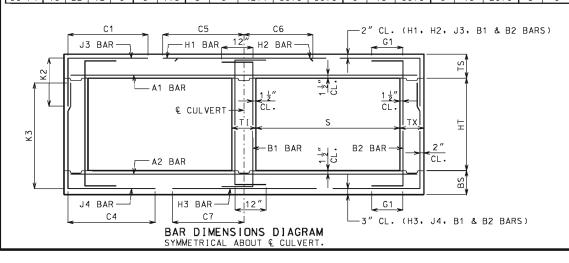
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7 OF 27

IF A SEAL IS PRESENT ON THIS

										SI	PAN (	S) =	7 F	Т		HE	E I GH	T (HT	) =	4 F1	OR	5 F		6 FT										
	_	MEM									TOP SL	AB BARS	3											OM SLA	AB BAR	S					₩AL			_
DESIGN		THICK	NESS	,	A1 I	BARS			J3	BARS				H1 BA	RS		H2 B4	RS	A2	BARS			J4	BARS				нз ва	RS	B1	BARS	B?	2 BARS	_
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	K2 HT=5'	HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=4'	K3 HT=5'	HT=6'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G	í1
1 FT	12	8	8	8	5	8	4	8.5	38.1	28.0	28.0	28.0	4	15	73.0	4	15	25.5	4	7	4	6.5	41.8	52	64	76	5	6.5	37.5	5	12	5	12 1	2
2 FT	12	9	8	8	5	7.5	4	8.5	38.1	28.0	28.0	28.0	4	14	73.0	4	14	24.5	4	7.5	4	8.5	39.9	53	65	77	5	7	37.5	5	12	5	12 1	2
4 FT	8	8	8	8	4	6	4	6.5	38.4	24.0	24.0	24.0	5	17	48.0	5	17	23.5	4	7	4	7	35.8	52	64	76	5	6	36.5	5	12	5	12 1	2
6 FT	8	8	8	8	4	7	4	7	33.9	24.0	24.0	24.0	5	17	39.0	5	17	23.5	4	6.5	4	6.5	33.3	52	64	76	6	7	38.5	5	12	5	12 1	2
8 FT	8	9	8	8	4	7	4	6.5	32.1	24.0	24.0	24.0	5	16	37.0	5	16	24.0	4	6.5	4	8	31.8	53	65	77	5	6	35.5	5	12	5	12 (	0
10 FT	8	10	8	8	4	6	5	7	31.5	24.0	24.0	24.0	5	15	36.0	5	15	24.0	4	6.5	4	9.5	30.5	54	66	78	5	6.5	35.5	5	12	5	12 (	0
12 FT	9	10	8	8	4	6	4	6.5	30.5	25.0	25.0	25.0	5	15	35.5	5	15	24.0	5	9	4	8.5	29.8	54	66	78	5	6	35.5	5	12	5	12 (	0
14 FT	9	11	8	8	5	8.5	5	7	30.4	25.0	25.0	25.0	5	14	35.5	5	14	24.0	5	9	4	8.5	29.1	55	67	79	5	6	35.5	5	12	5	12 (	0
16 FT	10	11	8	8	4	6	4	6.5	28.5	26.0	26.0	26.0	5	15	34.5	5	15	23.0	5	8.5	4	8	27.8	55	67	79	5	6	35.0	5	12	5	12 (	0
18 FT	10	12	8	8	5	8	5	8	28.6	26.0	26.0	26.0	5	14	34.5	5	14	23.5	5	8.5	4	8.5	27.4	56	68	80	5	6	35.0	5	12	5	12 (	0
20 FT	11	12	8	8	5	8	5	9	28.1	27.0	27.0	27.0	5	14	34.5	5	14	23.5	5	7	4	7	27.5	56	68	80	6	7	38.0	5	12	5	12 (	0
22 FT	12	13	8	8	5	8	5	8.5	27.9	28.0	28.0	28.0	5	13	34.5	5	13	23.0	5	7.5	4	7	27.5	57	69	81	6	7.5	38.0	5	12	5	12 (	0
24 FT	12	14	8	8	5	7.5	5	8.5	28.0	28.0	28.0	28.0	5	13	34.5	5	13	23.5	5	7.5	4	7	27.3	58	70	82	6	7.5	38.0	5	12	5	12 (	0
26 FT	13	15	8	8	5	7	5	8.5	27.9	29.0	29.0	29.0	5	12	34.5	5	12	22.5	5	7.5	4	7	27.4	59	71	83	6	7.5	38.0	5	12	5	12 (	0
28 FT	14	15	8	8	5	7	5	8.5	27.6	30.0	30.0	30.0	5	12	34.0	5	12	22.0	5	7	4	6.5	27.6	59	71	83	6	7	38.0	5	12	5	12 (	0
30 FT	14	16	8	8	5	6.5	5	8.5	27.8	30.0	30.0	30.0	5	12	34.0	5	12	22.5	5	7	4	6.5	27.5	60	72	84	6	7	38.0	5	12	5	12 (	0
32 FT	15	17	8	8	5	6.5	5	8	32.8	31.0	31.0	31.0	6	16	43.0	6	16	30.5	5	7.5	4	6	27.8	61	73	85	6	7.5	38.0	5	12	5	12 (	0
34 FT	16	17	8	8	5	6.5	5	7	32.6	32.0	32.0	32.0	6	15	42.5	6	15	29.5	5	7	4	6	27.9	61	73	85	6	7	38.0	5	12	5	11.5	0
36 FT	16	18	8	8	5	6	5	7	32.8	32.0	36.0	36.0	6	15	42.5	6	15	30.0	5	7	5	6.5	27.9	62	74	86	6	7	38.0	5	12	5	10.5	0
38 FT	17	18	8	8	5	6	5	6.5	32.8	37.0	37.0	37.0	6	14	42.0	6	14	29.5	5	6	5	6.5	28.0	62	74	86	6	6.5	38.0	5	12	5	10 (	0
40 FT	17	19	8	8	5	6	5	6.5	32.8	37.0	37.0	37.0	6	14	42.0	6	14	30.0	5	6.5	5	6.5	28.0	63	75	87	6	7	38.0	5	12	5	9.5	0
42 FT	18	20	8	8	5	6	5	6.5	32.9	38.0	38.0	38.0	6	14	41.5	6	14	29.5	5	6.5	5	6	28.3	64	76	88	6	7	38.0	5	12	5	9.5	0
44 FT	18	20	8	8	6	8	5	6.5	32.9	38.0	38.0	38.0	6	14	41.5	6	14	29.5	5	6.5	5	6	28.3	64	76	88	6	6.5	38.0	5	12	5	9.5	0
46 FT	19	21	8	8	6	8	5	6	33.0	39.0	39.0	39.0	6	14	41.0	6	14	29.5	5	6.5	6	7.5	31.5	65	77	89	6	6.5	38.0	5	12	5	9.5	0
48 FT	19	21	8	8	6	8	5	6	32.9	39.0	39.0	39.0	6	14	41.0	6	14	29.5	5	6	6	7.5	31.4	65	77	89	6	6.5	38.0	5	12	5	9.5 (	ΣŢ
50 FT	20	22	9	8	6	8	5	6.5	33.8	40.0	40.0	40.0	6	15	40.0	6	15	29.0	5	6	5	6	29.0	66	78	90	6	6.5	38.0	5	12	5	8.5 (	0

										SP	AN (S	<b>)</b> =	7 F	Т		H	EIGHT	(H	T) =	7 F	T OR	8 F1										
		MEM								TOP	SLAB	BARS									Е	BOTTOM	SLAB E	BARS					₩AL	L BA	RS	
DESIGN		THIC	KNES:	S	A 1	BARS			J3 BA	RS			H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA	RS			нз ва	RS	B1	BARS	B2	2 BARS	ŝ
FILL	TS	BS	ТХ	ΙΤ	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	2 HT=8'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZ	E SPA.	SIZE	SPA.	C4	HT=7'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G.
1 FT	12	9	8	8	5	7.5	4	8.5	38.1	28.0	28.0	4	15	73.0	4	15	25.5	4	7.5	4	7	56.0	89	101	5	7	37.5	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	4	8	38.1	28.0	28.0	4	15	73.0	4	15	25.0	4	7	4	6.5	51.4	89	101	5	7	37.5	5	12	5	12	1.
4 FT	8	9	8	8	4	6	5	6.5	40.1	24.0	24.0	5	17	75.0	5	17	23.5	4	7.5	4	6.5	47.8	89	101	5	7	37.0	5	12	5	12	1
6 FT	8	9	8	8	4	7	5	6.5	44.6	24.0	24.0	5	17	39.5	5	17	23.5	4	7	4	6	43.5	89	101	5	6.5	36.0	5	12	5	12	1.
8 FT	8	9	9	8	4	7	4	6	40.1	24.0	24.0	5	16	37.0	5	16	23.5	4	6.5	4	6.5	40.4	89	101	5	6	35.5	5	12	5	12	С
10 FT	8	10	9	8	4	6.5	5	6	38.4	24.0	24.0	5	15	36.0	5	15	24.0	4	6.5	4	7	39.5	90	102	5	6.5	35.5	5	12	5	12	(
12 FT	9	10	9	8	4	6	5	6.5	37.8	25.0	25.0	5	15	35.5	5	15	24.0	5	9	4	6	38.1	90	102	5	6	35.0	5	12	5	12	(
14 FT	9	11	9	8	5	8.5	5	6	37.1	25.0	25.0	5	14	35.0	5	14	23.5	5	9	4	6	37.9	91	103	5	6	35.5	5	12	5	12	(
16 FT	9	11	9	8	5	8.5	5	6	34.8	25.0	25.0	5	14	34.0	5	14	23.5	5	8.5	4	6	35.3	91	103	5	6	35.0	5	12	5	12	(
18 FT	10	12	9	8	5	8.5	5	7	34.9	26.0	30.0	5	14	34.0	5	14	23.5	5	8.5	5	8.5	35.3		104	5	6	35.0	5	12	5	12	(
20 FT	11	13	9	8	5	8	5	7.5	34.9	27.0	31.0	5	14	34.0	5	14	23.0	5	8.5	5	8	35.4	93	105	6	8	38.0	5	12	5	12	(
22 FT	11	13	9	8	5	7	5	6.5	34.8	27.0	31.0	5	13	34.0	5	13	23.5	5	7.5	5	8	35.1	93	105	6	7.5	38.0	5	12	5	11.5	(
24 FT	12	14	9	8	5	7.5	5	7	34.8	28.0	32.0	5	13	34.0	5	13	23.0	5	8	5	8	35.4	94	106	6	7.5	38.0	5	12	5	10.5	(
26 FT	13	15	9	8	5	7.5	5	7	34.9	29.0	33.0	5	12	33.5	5	12	22.0	5	8	5	8	35.6	95	107	6	7.5	38.0	5	12	5	9.5	(
28 FT	13	15	9	8	5	6.5	5	6.5	34.8	33.0	33.0	5	12	33.5	5	12	22.5	5	7	5	7.5	35.4	95	107	6	7	38.0	5	12	5	9	(
30 FT	14	16	9	8	5	7	5	6.5	34.9	34.0	34.0	5	12	33.0	5	12	21.5	5	7.5	5	7.5	35.6	96	108	6	7	38.0	5	12	5	8.5	C
32 FT	15		9	8	5	7	5	6	40.0	35.0	35.0	6	16	41.5	6	16	29.5	5	7.5	5	7.5	36.0	97	109	6	7.5	38.0	5	12	5	8.5	C
34 FT	15	_	10	8	5	6.5	5	7	40.5	35.0	35.0	6	16	41.5	6	16	30.0	5	6.5	5	7.5	36.0	97	109	6	7	38.0	5	12	5	8.5	C
36 FT	16	18	10	8	5	6.5	5	6.5	40.6	36.0	36.0	6	15	41.0	6	15	29.5	5	7	5	7.5	36.4	98	110	6	7	38.0	5	12	5	8	C
38 FT	16	_	11	8	5	6	5	7	41.3	32.0	36.0	6	15	40.5	6	15	29.5	5	7	5	7	36.8	99	111	6	7	38.0	5	12	5	8.5	C
40 FT	17	19	11	8	5	6	5	7	41.3	33.0	37.0	6	15	40.0	6	15	29.0	5	6.5	5	7	36.8	99	111	6	6.5	38.0	5	12	5	8	C
42 FT	17	20	11	8	5	6	5	6.5	41.4	37.0	37.0	6	15	40.0	6	15	29.0	5	6.5	5	7	36.9	100	112	6	7	38.0	5	12	5	7.5	C
44 FT	18	20	11	8	6	8.5	5	6	41.4	38.0	38.0	6	16	39.5	6	16	29.0	5	6.5	5	7	37.0	100	112	6	6.5	38.0	5	12	5	7.5	C
46 FT	18	21	12	8	6	8	5	6.5	42.1	38.0	38.0	6	15	39.5	6	15	29.0	5	6.5	5	7	37.4	101	113	6	6.5	38.0	5	12	5	7.5	C
48 FT	19		12	8	6	8	5	6.5	42.0	39.0	39.0	6	16	39.0	6	16	29.0	5	6	5	6.5	37.5	101	113	6	6.5	38.0	5	12	5	7	(
50 FT	19	22	12	8	6	7.5	5	6	42.1	39.0	39.0	6	15	39.0	6	15	29.0	5	6	5	6.5	37.6	102	114	6	6.5	38.0	5	12	5	7	ΙC



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 7 FEET
HE IGHT (HT): 4 THRU 8 FEET

DATE EFFECTIVE: DATE PREPARED:

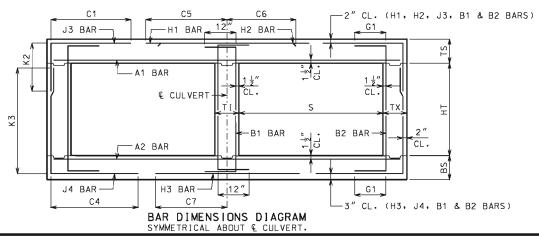
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**DC** 

										SPA	N (S)	=	7 FT			HE	[ GHT	(HT	) = 9	FT	OR	10 F1	ī									
		MEM								TOP	SLAB	BARS									E	BOTTOM	SLAB E	BARS					WAL	L BA	RS	
DESIGN	,	THICK	NESS	3	Α1	BARS			J3 BA				H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA	-			нз ва	RS	B1	BARS	В2	2 BARS	;
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=9'	.2 HT=10	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4		.3 HT=10′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7.5	4	6	38.1	28.0	28.0	4	16	73.0	4	16	26.0	4	7	6	7	68.1	113	125	5	7	38.0	5	12	5	12	12
2 FT	12	9	8	8	5	7.5	5	8.5	38.1	28.0	32.0	4	15	73.0	4	15	25.0	4	6.5	6	6.5	64.9	113	125	5	6.5	37.5	5	12	5	12	12
4 FT	8	9	9	8	4	6	5	6	40.8	24.0	28.0	5	17	75.5	5	17	23.5	4	7.5	5	6	57.8	113	125	5	7	37.0	5	12	5	11.5	12
6 FT	8	9	10	8	4	7	5	6.5	55.0	24.0	28.0	5	17	39.5	5	17	23.0	4	7	5	6.5	51.9	113	125	5	6.5	36.0	5	12	5	11.5	12
8 FT	8	9	10	8	4	7	5	6	49.0	28.0	28.0	5	16	37.0	5	16	23.5	4	6.5	5	6	49.3	113	125	5	6	35.5	5	12	5	10.5	0
10 FT	8	10	10	8	4	6.5	6	7	49.0	28.0	28.0	5	15	36.0	5	15	24.0	4	6.5	5	6	49.1	114	126	5	6	35.5	5	12	5	10	0
12 FT	9	10	10	8	4	6	5	6	46.1	29.0	29.0	5	16	35.5	5	16	23.5	5	9	6	7	50.3	114	126	5	6	35.0	5	12	5	9.5	0
14 FT	9	11	10	8	5	9	5	6	44.6	29.0	29.0	5	15	35.0	5	15	23.5	5	9	6	7.5	50.6	115	127	5	6	35.0	5	12	5	8.5	0
16 FT	9	11	10	8	5	9	5	6	41.5	29.0	29.0	5	14	34.0	5	14	23.5	5	8.5	5	6	44.0	115	127	5	6	35.0	5	12	5	9.5	0
18 FT	10	12	10	8	5	8.5	5	6.5	42.0	30.0	30.0	5	15	34.0	5	15	23.5	5	8.5	5	6	44.3	116	128	5	6	35.0	5	12	5	8.5	0
20 FT	11	13	10	8	5	8.5	5	6	42.4	31.0	31.0	5	14	33.5	5	14	22.5	5	8.5	5	6	44.6	117	129	6	8	38.0	5	12	5	8	0
22 FT	11	13	10	8	5	7.5	5	6	42.1	31.0	31.0	5	14	33.5	5	14	23.5	5	7.5	6	7	47.3	117	129	6	7.5	38.0	5	12	5	8	0
24 FT	12	14	10	8	5	7.5	5	6	42.5	32.0	32.0	5	13	33.5	5	13	22.5	5	8	6	7.5	47.6	118	130	6	7.5	38.0	5	12	5	8	0
26 FT	13	15	10	8	5	7.5	6	7	45.8	33.0	37.0	5	12	33.0	5	12	21.5	5	8	6	7.5	47.9	119	131	6	7.5	38.0	5	12	5	8	0
28 FT	13	16	11	8	5	7	5	6	42.9	33.0	33.0	5	12	32.5	5	12	22.0	5	8	5	6.5	45.3	120	132	6	7.5	38.0	5	12	5	7.5	0
30 FT	14	16	11	8	5	7	6	7.5	46.1	34.0	34.0	5	12	32.0	5	12	21.0	5	7.5	5	6	45.0	120	132	6	7	38.0	5	12	5	7.5	0
32 FT	14	17	12	8	5	7	5	6	43.4	34.0	34.0	5	12	32.0	5	12	21.5	5	7.5	5	6.5	45.4	121	133	6	7	38.0	5	12	5	7	0
34 FT	15	17	12	8	5	6.5	6	8.5	52.6	35.0	35.0	6	16	40.5	6	16	29.5	5	6.5	5	6.5	45.1	121	133	6	7	38.0	5	12	5	7	0
36 FT	15	18	13	8	5	6	6	8.5	52.9	35.0	35.0	6	16	40.0	6	16	29.5	5	7	5	6	45.5	122	134	6	7	38.0	5	12	5	6.5	0
38 FT	16	19	13	8	5	6.5	6	8	53.1	36.0	36.0	6	16	39.5	6	16	29.0	5	7	5	6	45.9	123	135	6	7	38.0	5	12	5	6.5	0
40 FT	17	19	13	8	5	6	6	7.5	53.4	37.0	37.0	5	12	35.0	5	12	25.0	5	6.5	5	6	45.8	123	135	6	6.5	38.0	5	12	5	6.5	0
42 FT	17	20	14	8	5	6	6	8	53.8	37.0	37.0	6	16	39.0	6	16	29.0	5	6.5	5	6	46.1	124	136	6	6.5	38.5	5	12	5	6	0
44 FT	17	20	14	8	6	8.5	6	7.5	53.6	37.0	37.0	6	15	39.0	6	15	29.0	5	6	5	6	46.1	124	136	6	6.5	38.5	5	12	5	6	0
46 FT	18	21	14	8	6	8	6	7	53.9	38.0	38.0	6	17	38.5	6	17	29.0	5	6.5	5	6	46.5	125	137	6	6.5	38.0	5	12	5	6	0
48 FT	18	22	15	8	6	8	6	7.5	54.3	38.0	42.0	6	16	38.5	6	16	29.0	5	6.5	6	8	49.9	126	138	6	6.5	38.5	5	12	5	6	0
50 FT	18	22	15	8	6	7.5	6	7.5	54.3	38.0	42.0	6	15	38.5	6	15	29.0	5	6	6	8	49.9	126	138	6	6	38.5	5	12	6	8	0



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#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 7 FEET HEIGHT (HT): 9 THRU 10 FEET

DATE EFFECTIVE: DATE PREPARED:

10/01/2011 9/8/2011

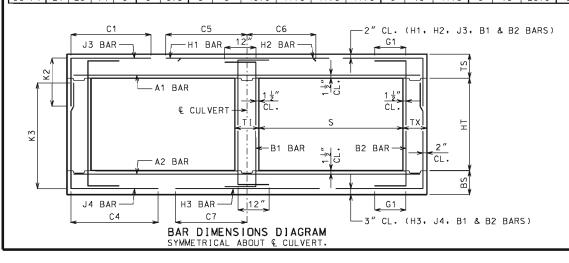
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SHEET NO. 9 OF 27

	C1 C5 C6
K2	
1	A1 BAR 1 ½" 1½" 1½"
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	€ CULVERT    TILE  S  CL. TX
K3	
	A2 BAR
V	
	J4 BAR —
	BAR DIMENSIONS DIAGRAM

										SI	PAN (	S) =	8 F	Т		HE	I GH	Т (НТ	) =	4 F1	OR	5 F	T OR	6 FT										Ī
		MEM									TOP SL	AB BARS	5										BOT1	OM SLA	AB BAR	S					₩AL	L BAI	.RS	
DESIGN		THICK	NESS	S	Α1	BARS			J3	BARS				H1 BA	RS		H2 B4	RS	A2	BARS			J4	BARS				нз ва	RS	B1	BARS	B2	2 BARS	
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	K2 HT=5'	HT=6'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	K3 HT=5'	HT=6′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7	4	8.5	41.8	28.0	28.0	28.0	4	12	81.5	4	12	26.5	4	7	4	8	43.0	53	65	77	5	6.5	41.0	5	12	5	12	12
2 FT	13	9	8	8	5	7.5	4	7.5	41.8	29.0	29.0	29.0	4	13	81.5	4	13	26.5	4	6.5	4	7	39.1	53	65	77	5	6	40.5	5	12	5	12	12
4 FT	8	8	8	8	4	6	5	6.5	36.4	24.0	24.0	24.0	5	15	51.0	5	15	26.5	4	6	4	6	35.3	52	64	76	6	6.5	42.5	5	9.5	5	12	12
6 FT	8	9	8	8	4	6	5	6.5	34.3	24.0	24.0	24.0	5	15	42.5	5	15	26.0	4	6	4	7.5	33.1	53	65	77	6	7	42.0	5	12	5	12	12
8 FT	8	9	8	8	4	6	5	6	33.1	24.0	24.0	24.0	5	13	40.5	5	13	25.5	5	8.5	4	7	31.6	53	65	77	6	6.5	41.5	5	12	5	12	0
10 FT	9	10	8	8	5	8.5	4	6	31.9	25.0	25.0	25.0	5	14	39.5	5	14	25.5	5	8	4	8	30.4	54	66	78	6	7	41.5	5	12	5	12	0
12 FT	10	11	8	8	5	8	4	6	30.6	26.0	26.0	26.0	5	14	39.0	5	14	25.0	5	8	4	8	29.3	55	67	79	6	7	41.5	5	12	5	12	0
14 FT	11	12	8	8	5	8	4	6	29.8	27.0	27.0	27.0	5	14	38.5	5	14	25.0	5	7.5	4	7.5	28.6	56	68	80	6	7	41.5	5	12	5	12	0
16 FT	11	13	8	8	5	7.5	5	8.5	29.6	27.0	27.0	27.0	5	12	38.5	5	12	25.0	5	7.5	4	8	28.0	57	69	81	6	7	41.5	5	12	5	12	0
18 FT	12	13	8	8	5	7.5	4	6	27.5	28.0	28.0	28.0	5	13	37.5	5	13	25.0	5	7	4	7.5	26.8	57	69	81	6	7	41.0	5	12	5	12	0
20 FT	12	14	8	8	5	7	5	8.5	27.8	28.0	28.0	28.0	5	12	37.5	5	12	25.0	5	7	4	7.5	26.4	58	70	82	6	7	41.5	5	12	5	12	0
22 FT	13	15	8	8	5	6.5	6	8.5	27.4	29.0	29.0	29.0	5	12	37.5	5	12	25.0	5	7	4	7	26.4	59	71	83	6	7	41.5	5	12	5	12	0
24 FT	14	16	8	8	5	6.5	5	8.5	27.3	30.0	30.0	30.0	5	12	37.5	5	12	24.5	5	7	4	6.5	26.5	60	72	84	6	7	41.5	5	12	5	12	0
26 FT	15	16	8	8	5	6.5	5	8	31.9	31.0	31.0	31.0	6	16	46.5	6	16	33.0	5	6.5	4	6.5	26.6	60	72	84	6	7	41.0	5	12	5	12	0
28 FT	16	17	8	8	5	6	5	7	31.8	32.0	32.0	32.0	6	15	46.0	6	15	32.0	5	6.5	4	6	26.8	61	73	85	6	6.5	41.0	5	12	5	12	0
30 FT	16	18	8	8	5	6	5	7	32.0	32.0	32.0	36.0	6	15	46.0	6	15	33.0	5	6.5	5	6.5	26.6	62	74	86	6	6.5	41.0	5	12	5	12	0
32 FT	17	19	8	8	5	6	5	6.5	31.9	37.0	37.0	37.0	6	14	45.5	6	14	32.0	5	6.5	5	6.5	26.8	63	75	87	6	6.5	41.0	5	12	5	12	0
34 FT	18	19	8	8	6	8.5	5	6.5	31.8	38.0	38.0	38.0	6	13	45.5	6	13	31.0	5	6	5	6.5	26.9	63	75	87	6	6	41.0	5	12	5	11	0
36 FT	18	20	8	8	6	8	5	6.5	31.9	38.0	38.0	38.0	6	13	45.5	6	13	32.0	5	6	5	6	26.9	64	76	88	6	6	41.0	5	12	5	10	0
38 FT	19	21	8	8	6	8	5	6	32.0	39.0	39.0	39.0	6	13	45.0	6	13	31.0	5	6	6	7.5	30.1	65	77	89	6	6	41.0	5	12	5	9.5	0
40 FT	20	22	8	8	6	7.5	6	7.5	36.0	44.0	44.0	44.0	6	13	44.5	6	13	30.5	5	6	6	7	30.4	66	78	90	6	6	41.0	5	12	5	9.5	0
42 FT	20	22	8	8	6	7.5	6	7.5	36.0	44.0	44.0	44.0	6	12	44.5	6	12	30.5	6	8.5	6	7	30.3	66	78	90	6	6	41.0	5	12	5	9.5	0
44 FT	21	23	8	8	6	7.5	6	7	36.0	45.0	45.0	45.0	6	12	43.5	6	12	30.0	6	8.5	6	6.5	30.5	67	79	91	6	6	41.0	5	12	5	9.5	0
46 FT	21	23	8	8	6	7	6	7	36.0	45.0	45.0	45.0	6	12	43.5	6	12	30.0	6	8	6	6.5	30.5	67	79	91	7	7.5	44.0	5	12	5	9.5	0
48 FT	22	24	8	8	6	7	6	6.5	36.1	46.0	46.0	46.0	6	12	43.0	6	12	30.0	6	8	6	6	30.8	68	80	92	7	7.5	44.0	5	12	5	9	0
50 FT	22	24	8	8	6	6.5	6	6.5	36.1	46.0	46.0	46.0	6	12	43.0	6	12	30.0	6	7.5	6	6	30.8	68	80	92	7	7.5	44.0	5	12	5	8.5	0

										SI	PAN (	S) =	8 F	Т		HE	E I GH	T (HT	) =	7 FT	OR	8 F	T OR	9 FT										
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	B BAR	S					WAL	L BA	RS	
DESIGN		THIC	(NES	S	Α1	BARS			J3	BARS				H1 BA	ARS		H2 B#	\RS	A2	BARS			J4	BARS				нз ва	RS	B1 6	BARS	B:	2 BARS	S
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	K2 HT=8'	HT=9'	S I ZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	K3 HT=8′	HT=9′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	8	5	7	4	6.5	41.8	28.0	28.0	28.0	4	12	81.5	4	12	27.5	4	6	5	6.5	61.6	89	101	113	5	6	41.0	5	12	5	12	12
2 FT	13	10	8	8	5	7	4	6.5	41.8	29.0	29.0	29.0	4	13	81.5	4	13	27.0	4	6.5	4	6	58.3	90	102	114	5	6.5	40.5	5	12	5	12	12
4 FT	8	9	8	8	4	6	6	7.5	43.8	24.0	24.0	28.0	5	15	83.5	5	15	27.0	4	6	5	6	52.3	89	101	113	5	6	40.0	5	11	5	12	1:
6 FT	8	10	8	8	4	6	6	7.5	51.4	24.0	24.0	28.0	5	15	43.0	5	15	26.0	4	6.5	5	6	49.0	90	102	114	5	6.5	39.5	5	12	5	12	1:
8 FT	8	11	8	8	4	6	6	7.5	46.6	24.0	24.0	28.0	5	13	40.5	5	13	25.5	4	6.5	5	6.5	46.3	91	103	115	5	6	39.0	5	12	5	12	0
10 FT	9	11	8	8	5	8.5	6	7	45.3	25.0	25.0	29.0	5	14	39.5	5	14	25.5	5	8.5	5	6	43.6	91	103	115	5	6	38.5	5	12	5	11	С
12 FT	10	12	8	8	5	8	6	7	44.4	26.0	30.0	30.0	5	14	39.0	5	14	25.0	5	8.5	5	6	42.5	92	104	116	5	6	38.5	5	12	5	10	C
14 FT	11	12	8	8	5	8	6	7	43.5	27.0	31.0	35.0	5	14	38.5	5	14	25.0	5	7.5	6	7	44.4	92	104	116	6	7	41.5	5	12	5	9.5	(
16 FT	11	13	8	8	5	7.5	6	6.5	42.9	27.0	31.0	35.0	5	12	38.0	5	12	25.0	5	7.5	6	7	44.0	93	105	117	6	7.5	41.5	5	12	5	9.5	
18 FT	12	13	8	8	5	7.5	5	6	37.1	28.0	32.0	32.0	5	13	37.5	5	13	25.0	5	7	6	7.5	41.1	93	105	117	6	7	41.0	5	12	5	9.5	(
20 FT	12	14	8	8	5	7	6	7	39.9	32.0	32.0	36.0	5	12	37.5	5	12	25.0	5	7	6	7.5	41.1	94	106	118	6	7	41.0	5	12	5	9.5	(
22 FT	13	15	8	8	5	6.5	6	7	39.9	33.0	33.0	37.0	5	12	37.0	5	12	25.0	5	7	6	7.5	41.3	95	107	119	6	7	41.0	5	12	5	9.5	(
24 FT	14	16	8	8	5	6.5	6	7	40.0	34.0	34.0	38.0	5	12	37.0	5	12	24.0	5	7	6	7	41.4	96	108	120	6	7	41.0	5	12	5	9	(
26 FT	15	16	9	8	5	6.5	5	6	42.4	35.0	35.0	35.0	6	16	45.5	6	16	32.0	5	6.5	5	6	38.5	96	108	120	6	7	41.0	5	12	5	8.5	(
28 FT	15	17	10	8	5	6	5	6.5	42.9	31.0	35.0	35.0	6	16	45.5	6	16	33.0	5	6.5	5	7.5	38.8	97	109	121	6	6.5	41.5	5	12	5	8	(
30 FT	16	18	11	8	5	6	5	6.5	43.6	32.0	36.0	36.0	6	15	44.5	6	15	31.5	5	6.5	5	7	39.1	98	110	122	6	6.5	41.5	5	12	5	8.5	(
32 FT	17	19	11	8	5	6	5	6.5	43.6	33.0	37.0	37.0	6	14	44.0	6	14	31.0	5	6.5	5	7	39.4	99	111	123	6	6	41.5	5	12	5	7.5	(
34 FT	17	20	11	8	6	8	5	6	43.8	37.0	37.0	37.0	6	14	44.0	6	14	31.5	5	6.5	5	7	39.5	100	112	124	6	6	41.5	5	12	5	7.5	(
36 FT	18	20	12	8	6	8	5	6.5	44.3	38.0	38.0	38.0	6	13	43.5	6	13	30.5	5	6	5	6.5	39.6	100	112	124	6	6	41.5	5	12	5	7.5	(
38 FT	18	21	12	8	6	7.5	5	6	44.4	38.0	38.0	38.0	6	13	43.5	6	13	31.0	5	6	5	6.5	39.9	101	113	125	6	6	41.5	5	12	5	7	С
40 FT	19	22	12	8	6	7.5	6	8.5	48.4	39.0	39.0	39.0	6	13	42.5	6	13	30.0	5	6	5	6.5	40.1	102	114	126	6	6	41.5	5	12	5	7	C
42 FT	19	22	13	8	6	7	5	6	45.0	39.0	39.0	39.0	6	13	42.5	6	13	30.5	6	8	5	6.5	40.3	102	114	126	7	7.5	44.5	5	12	5	7	(
44 FT	20	23	13	8	6	7	6	8.5	49.1	40.0	40.0	40.0	6	13	42.0	6	13	30.0	6	8	5	6	40.5	103	115	127	7	7.5	44.5	5	12	5	7	(
46 FT	20	24	13	8	6	6.5	6	8	49.3	40.0	40.0	40.0	6	12	42.0	6	12	30.0	6	8	5	6	40.6	104	116	128	7	7.5	44.5	5	12	5	6.5	(
48 FT	21	24	13	8	6	7	6	7.5	49.1	41.0	41.0	41.0	6	13	41.5	6	13	29.5	6	8	5	6	40.8	104	116	128	7	7.5	44.5	5	12	5	6.5	(
50 FT	21	25	14	8	6	6.5	6	8	49.9	41.0	41.0	41.0	6	13	41.5	6	13	29.5	6	8	5	6.5	41.1	105	117	129	7	7.5	44.5	5	12	5	6.5	(



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.



105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET HE[GHT (HT): 4 THRU 9 FEET

DATE EFFECTIVE: DATE PREPARED:

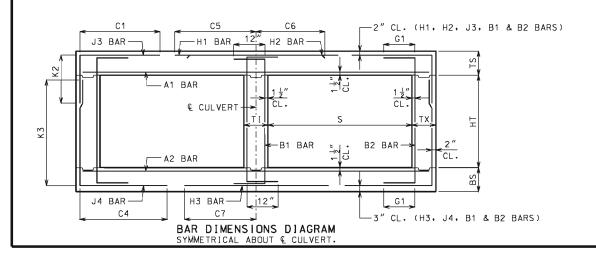
10/01/2011 9/8/2011

703.47

SHEET NO. 10 OF 27

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD. MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

										SPAN	(S)	= 8	3 FT			HE	[GHT	(HT	) = '	10 F	T OR	11 F	Т									1
		MEM								TOP	SLAB I	BARS									В	MOTTO	SLAB E	BARS					WAL	L BA	.RS	
DESIGN		THICK	NESS	5	Α1	BARS			J3 BA	RS			H1 BA	RS		H2 BA	RS	A2	BARS			J4 BA				нз ва	RS	B1	BARS	B2	2 BARS	š
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=10'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	3 HT=11′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9	8	9	5	7	5	7.5	41.9	32.0	32.0	4	12	81.5	4	12	27.5	5	9	6	6	73.9	125	137	5	6	41.5	5	12	5	10.5	12
2 FT	13	10	9	9	5	7	5	8	42.5	29.0	33.0	4	13	82.0	4	13	27.0	4	6	5	6	66.8	126	138	5	6.5	41.0	5	12	5	11	12
4 FT	8	11	9	9	4	6	6	7	44.5	24.0	28.0	5	16	84.0	5	16	27.0	4	7	5	6	66.0	127	139	5	7.5	41.0	5	10.5	5	9.5	12
6 FT	8	11	9	9	4	6	6	7	61.5	28.0	32.0	5	15	43.0	5	15	26.0	4	6.5	6	7	64.5	127	139	5	7	40.0	5	11.5	5	9	12
8 FT	8	11	9	9	4	6	6	7	55.6	28.0	32.0	5	14	40.5	5	14	25.5	4	6	6	6.5	60.4	127	139	5	6	39.5	5	11.5	5	8.5	0
10 FT	9	11	9	9	5	8.5	6	7.5	54.9	29.0	33.0	5	14	39.5	5	14	25.5	5	8.5	6	6	57.5	127	139	5	6	39.0	5	12	5	8.5	0
12 FT	10	11	9	9	5	8	5	6	51.1	30.0	30.0	5	14	39.0	5	14	25.5	5	7.5	6	6	55.3	127	139	6	7	41.5	5	12	5	8.5	0
14 FT	10	12	9	9	5	8	6	6.5	52.0	30.0	34.0	5	13	38.5	5	13	25.5	5	7.5	6	6	54.8	128	140	6	7	41.5	5	12	5	8.5	0
16 FT	11	13	10	9	5	7.5	5	6	48.6	31.0	31.0	5	13	38.0	5	13	25.5	5	7.5	6	6.5	54.1	129	141	6	7.5	41.5	5	12	5	8	0
18 FT	11	13	10	9	5	7.5	5	6	45.1	31.0	31.0	5	12	37.0	5	12	25.0	5	7	6	6.5	50.4	129	141	6	7	41.5	5	12	5	8	0
20 FT	12	14	10	9	5	7	6	7.5	48.4	32.0	36.0	5	13	37.0	5	13	25.0	5	7	6	6.5	50.5	130	142	6	7.5	41.5	5	12	5	8	0
22 FT	13	15	10	9	5	7	6	7	48.5	33.0	37.0	5	12	37.0	5	12	24.5	5	7	6	6.5	50.6	131	143	6	7	41.5	5	12	5	8	0
24 FT	13	16	11	9	5	6.5	6	8	48.5	33.0	33.0	5	12	36.5	5	12	25.0	5	7	5	6	47.8	132	144	6	7	41.5	5	12	5	7.5	0
26 FT	14	16	12	9	5	6.5	5	6	46.0	34.0	34.0	5	12	36.0	5	12	24.5	5	6	5	6	47.5	132	144	6	7	41.5	5	12	5	7	0
28 FT	15	17	12	9	5	6.5	6	8	55.3	35.0	35.0	6	16	44.5	6	16	32.5	5	6.5	5	6	47.8	133	145	6	6.5	41.5	5	12	5	7	0
30 FT	16	18	13	9	5	6.5	6	8	55.8	36.0	36.0	6	15	44.0	6	15	31.5	5	6.5	5	6	48.0	134	146	6	6.5	41.5	5	12	5	6.5	0
32 FT	16	19	13	9	5	6	6	7.5	55.8	36.0	36.0	6	15	44.0	6	15	32.0	5	6.5	5	6	48.3	135	147	6	6	41.5	5	12	5	6.5	0
34 FT	17	20	13	9	5	6	6	7	56.0	37.0	37.0	6	14	43.5	6	14	31.0	5	6.5	5	6	48.5	136	148	6	6.5	41.5	5	12	5	6.5	0
36 FT	17	20	14	9	6	8	6	7.5	56.1	37.0	37.0	6	14	43.0	6	14	31.5	5	6	5	6	48.6	136	148	6	6	41.5	5	12	5	6	0
38 FT	18	21	14	9	6	8	6	7	56.4	38.0	38.0	6	13	42.5	6	13	30.5	5	6	5	6	48.9	137	149	6	6	41.5	5	12	5	6	0
40 FT	18	22	15	9	6	7	6	7.5	56.8	38.0	42.0	6	13	42.5	6	13	30.5	5	6	6	8	52.3	138	150	6	6	41.5	5	12	6	8	0
42 FT	19	22	15	9	6	7.5	6	7	57.0	39.0	43.0	6	14	42.0	6	14	30.0	6	8.5	6	8	52.3	138	150	7	7.5	44.5	5	12	6	8	0
44 FT	19	23	15	9	6	6.5	6	6.5	56.9	39.0	43.0	6	13	42.0	6	13	30.0	6	8.5	6	8	52.5	139	151	7	8	44.5	5	12	6	8	0
46 FT	20	24	16	9	6	7	6	7	57.6	40.0	44.0	6	14	41.5	6	14	30.0	6	8	6	7.5	52.9	140	152	7	8	44.5	5	12	6	8	0
48 FT	20	24	16	9	6	6.5	6	6.5	57.5	40.0	44.0	6	13	41.5	6	13	30.0	6	8	6	7.5	52.9	140	152	7	7.5	44.5	5	12	6	8	0
50 FT	21	25	16	9	6	6.5	6	6	57.8	41.0	45.0	6	14	41.0	6	14	30.0	6	8	6	7.5	53.1	141	153	7	7.5	44.5	5	12	6	8	0



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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 8 FEET
HIS SHEET HAS BEEN
SIGNED, SPALED AND DATED
ELECTRONICALLY.

HE [GHT (HT): 10 THRU 11 FEET

DATE EFFECTIVE: DATE PREPARED:

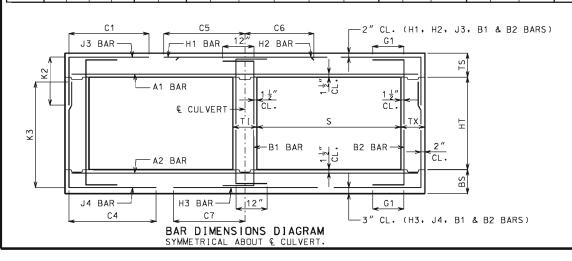
9/8/2011

703.47

SHEET NO. 11 OF 27

										S	PAN (	S) =	9 F	Т		HE	E I GH	Г (НТ	) =	5 FT	OR	6 F	T OR	7 FT										
		MEM									TOP SL	AB BAR	S										BOTT	OM SLA	B BARS	5					₩AL	L BA	.RS	
DESIGN		THICK	NESS		A1	BARS			J3	BARS				H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1	BARS	B2	2 BARS	<u>.</u>
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	K2   HT=6'	HT=7'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZ	SPA.	SIZE	SPA.	C4	HT=5'	K3 HT=6'	HT=7′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	8	8	5	6.5	4	7.5	45.3	29.0	29.0	29.0	5	17	89.5	5	17	28.5	4	6	4	6	47.3	65	77	89	5	6	44.0	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	4	7.5	45.3	29.0	29.0	29.0	5	16	89.5	5	16	27.5	4	6	4	7.5	44.5	66	78	90	5	6.5	44.0	5	12	5	12	12
4 FT	9	9	8	8	5	8.5	5	6.5	42.1	25.0	25.0	25.0	5	15	59.0	5	15	28.5	5	8	4	6	39.5	65	77	89	6	6.5	46.0	5	11	5	12	12
6 FT	9	9	8	8	5	8.5	5	6.5	36.9	25.0	25.0	29.0	5	14	47.0	5	14	27.5	5	7.5	5	7	36.5	65	77	89	6	6	45.0	5	12	5	12	12
8 FT	9	10	8	8	5	8.5	5	6.5	35.6	25.0	25.0	25.0	5	12	44.0	5	12	27.0	5	7.5	4	6.5	34.6	66	78	90	6	6.5	45.0	5	12	5	12	0
10 FT	10	11	8	8	5	8	5	7.5	34.3	26.0	26.0	26.0	5	12	43.0	5	12	26.5	5	7.5	4	6.5	33.3	67	79	91	6	6.5	44.5	5	12	5	12	0
12 FT	11	12	8	8	5	7.5	5	8.5	33.0	27.0	27.0	27.0	5	12	42.5	5	12	26.5	5	7	4	6	32.1	68	80	92	6	6.5	44.5	5	12	5	12	0
14 FT	12	13	8	8	5	7	5	8.5	32.1	28.0	28.0	28.0	5	12	42.0	5	12	26.5	5	6.5	4	6	31.5	69	81	93	6	6.5	44.5	5	12	5	12	0
16 FT	13	14	8	8	5	6.5	5	8.5	31.5	29.0	29.0	33.0	6	16	44.5	6	16	29.5	5	6.5	5	8.5	31.0	70	82	94	6	6.5	44.5	5	12	5	12	0
18 FT	13	15	8	8	5	6.5	5	8	31.3	29.0	29.0	33.0	6	15	44.5	6	15	29.5	5	6.5	5	8.5	30.5	71	83	95	6	6.5	44.5	5	12	5	12	0
20 FT	14	15	8	8	5	6	5	8.5	29.3	30.0	30.0	34.0	6	16	43.5	6	16	29.0	5	6	5	8.5	29.1	71	83	95	6	6.5	44.5	5	12	5	12	0
22 FT	15	16	8	8	5	6	5	8	34.1	31.0	31.0	35.0	6	15	49.5	6	15	35.0	5	6	5	8	29.1	72	84	96	6	6.5	44.5	5	12	5	12	0
24 FT	15	17	8	8	6	7.5	5	8	34.3	31.0	31.0	35.0	6	14	49.5	6	14	35.0	5	6	5	7	28.9	73	85	97	6	6.5	44.5	5	12	5	12	0
26 FT	16	18	8	8	6	8	5	7	34.1	32.0	36.0	36.0	6	14	49.0	6	14	35.0	5	6	5	6.5	29.0	74	86	98	6	6.5	44.5	5	12	5	11	0
28 FT	17	19	8	8	6	7.5	5	6.5	34.0	37.0	37.0	37.0	6	14	49.0	6	14	35.0	5	6	5	6.5	29.1	75	87	99	6	6	44.5	5	12	5	10	0
30 FT	18	20	8	8	6	7.5	5	6.5	34.0	38.0	38.0	38.0	6	13	48.5	6	13	34.0	6	8.5	5	6	29.3	76	88	100	6	6	44.5	5	12	5	9.5	0
32 FT	19	21	8	8	6	7.5	5	6	34.1	39.0	39.0	39.0	6	13	48.0	6	13	33.0	6	8.5	6	7.5	32.5	77	89	101	7	7.5	47.0	5	12	5	9.5	0
34 FT	20	21	8	8	6	7.5	6	7.5	38.0	44.0	44.0	44.0	6	12	47.5	6	12	32.5	6	7.5	6	7.5	32.6	77	89	101	7	7.5	47.0	5	12	5	9.5	0
36 FT	20	22	8	8	6	7	6	7.5	38.0	44.0	44.0	44.0	6	12	47.5	6	12	33.0	6	8	6	7	32.6	78	90	102	7	7.5	47.0	5	12	5	9.5	0
38 FT	21	23	8	8	6	7	6	7	38.1	45.0	45.0	45.0	6	12	47.0	6	12	32.0	6	7.5	6	6.5	32.8	79	91	103	7	7	47.0	5	12	5	9	0
40 FT	22	24	8	8	6	6.5	6	6.5	38.3	46.0	46.0	46.0	7	15	51.5	7	15	36.0	6	7.5	6	6	33.0	80	92	104	7	7	47.0	5	12	5	8	0
42 FT	22	24	8	8	6	6.5	6	6	38.1	46.0	46.0	46.0	7	15	51.5	7	15	36.5	6	7.5	6	6	33.0	80	92	104	7	7	47.0	5	12	5	7.5	0
44 FT	23	25	9	8	6	6.5	6	7	39.0	47.0	47.0	47.0	7	15	50.5	7	15	36.0	6	7.5	6	7	33.5	81	93	105	7	7	47.0	5	12	5	8.5	0
46 FT	24	26	9	8	6	6	6	7	39.0	48.0	48.0	48.0	7	15	49.5	7	15	35.5	6	7.5	6	6.5	33.8	82	94	106	7	7	47.0	5	12	5	8	0
48 FT	24	26	9	8	6	6	6	7	39.0	48.0	48.0	48.0	7	15	49.5	7	15	35.5	6	6.5	6	6.5	33.8	82	94	106	7	6.5	47.0	5	12	5	8	0
50 FT	25	27	9	8	6	6	6	6.5	39.0	49.0	49.0	49.0	7	15	49.0	7	15	35.5	6	7	6	6.5	34.0	83	95	107	7	6.5	47.0	5	12	5	7.5	0

		SPAN (S) = 9 FT           MEMBER         TOP SLAB BARS           THICKNESS         A1 BARS         H1 BARS														HE :	GHT	(HT)	= 8	3 FT	OR	9 FT	OR 1	0 FT										
											TOP SL	AB BARS	S										BOTT	OM SLA	AB BAR	S					₩AL	L BA	RS	
DESIGN		THICK	NESS	S	Α1	BARS			J3	BARS				H1 BA	\RS		H2 BA	RS	Α2	BARS			J4	BARS				нз ва	ıRS	B1	BARS	B2	2 BARS	
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10'	S I ZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	31
1 FT	13	10	8	8	5	6.5	5	8.5	47.3	29.0	29.0	33.0	5	18	91.5	5	18	29.0	4	6	5	6	69.0	102	114	126	5	6.5	44.5	5	12	5	12 1	12
2 FT	13	10	8	8	5	6.5	5	8.5	47.3	29.0	29.0	33.0	5	17	91.5	5	17	28.0	5	9	6	7	66.6	102	114	126	5	6	44.0	5	12	5	12 1	12
4 FT	9	9	8	8	5	8.5	6	7	47.3	29.0	33.0	33.0	5	15	91.5	5	15	29.0	5	7.5	6	6	59.4	101	113	125	6	6	46.0	5	12	5	10.5 1	12
6 FT	9	10	9	8	5	8.5	5	6	54.1	25.0	25.0	29.0	5	14	48.0	5	14	27.5	5	8	5	6	51.8	102	114	126	6	6.5	45.5	5	12	5	11.5 1	12
8 FT	9	11	9	8	5	8.5	5	6	48.0	25.0	29.0	29.0	5	13	44.0	5	13	27.0	5	8	5	6	49.3	103	115	127	6	7	45.0	5	12	5	11	ᇬ
10 FT	10	11	9	8	5	8	5	6	46.6	26.0	30.0	30.0	5	12	43.0	5	12	26.5	5	7	6	7	50.0	103	115	127	6	6.5	44.5	5	12	5	10	$\overline{}$
12 FT	11	12	9	8	5	7.5	6	7	48.4	31.0	31.0	35.0	5	12	42.0	5	12	26.5	5	7	6	7	49.0	104	116	128	6	6.5	44.5	5	12	5	9.5	0
14 FT	12	13	9	8	5	7	6	7.5	47.4	32.0	32.0	36.0	5	12	41.5	5	12	26.5	5	6.5	6	7	48.1	105	117	129	6	6.5	44.5	5	12	5	8.5	0
16 FT	12	14	9	8	5	7	6	6.5	46.4	32.0	32.0	36.0	6	15	44.5	6	15	29.5	5	6.5	6	7	47.5	106	118	130	6	6.5	44.5	5	12	5	8.5	0
18 FT	13	15	9	8	5	6.5	6	6.5	46.0	33.0	33.0	37.0	6	15	44.0	6	15	29.0	5	6.5	6	7.5	47.3	107	119	131	6	7	44.5	5	12	5	8.5	0
20 FT	14	15	9	8	5	6.5	5	6	40.1	34.0	34.0	34.0	6	16	43.0	6	16	29.0	5	6	6	7.5	44.4	107	119	131	6	6.5	44.5	5	12	5	8.5	0
22 FT	14	16	10	8	5	6	5	6	40.5	34.0	34.0	34.0	6	15	43.0	6	15	29.0	5	6	5	7	41.5	108	120	132	6	6.5	44.5	5	12	5	8	0
24 FT	15	17	10	8	6	8	6	8	49.5	35.0	35.0	35.0	6	15	48.5	6	15	35.0	5	6	5	6.5	41.6	109	121	133	6	6.5	44.5	5	12	5	8	0
26 FT	16	18	11	8	6	8	5	6	46.1	36.0	36.0	36.0	6	15	48.0	6	15	34.5	5	6	5	7	41.9	110	122	134	6	6.5	44.5	5	12	5		0
28 FT	17	19	11	8	6	8	6	8	50.1	37.0	37.0	37.0	6	14	47.5	6	14	33.5	5	6	5	7	42.0	111	123	135	6	6	44.5	5	12	5	7.5	0
30 FT	18	20	12	8	6	8	5	6	46.8	38.0	38.0	38.0	6	13	47.0	6	13	32.5	6	8.5	5	6.5	42.4	112	124	136	6	6	44.5	5	12	5	7.5	의
32 FT	18	21	12	8	6	7.5	6	8	50.8	38.0	38.0	38.0	6	13	47.0	6	13	33.5	6	8	5	6.5	42.5	113	125	137	7	7.5	47.5	5	12	5	7	<u></u>
34 FT	19	22	12	8	6	7	6	7.5	50.9	39.0	39.0	39.0	6	13	46.0	6	13	32.5	6	8	5	6.5	42.8	114	126	138	7	7.5	47.5	5	12	5	7	의
36 FT	20	23	13	8	6	7	6	8	51.5	40.0	40.0	40.0	6	12	45.0	6	12	31.5	6	8	5	6	43.1	115	127	139	7	7	47.5	5	12	5	6.5	의
38 FT	20	23	13	8	6	6.5	6	7.5	51.4	40.0	40.0	40.0	6	12	45.0	6	12	32.0	6	7.5	5	6	43.0	115	127	139	7	7	47.5	5	12	5	6.5	의
40 FT	21	24	13	8	6	6.5	6	7	51.5	41.0	41.0	41.0	6	12	44.5	6	12	31.0	6	7.5	5	6	43.3	116	128	140	7	7	47.5	5	12	5	6.5	의
42 FT	21	25	14	8	6	6	6	7.5	52.3	41.0	41.0	41.0	6	12	44.5	6	12	31.5	6	7.5	5	6	43.5	117	129	141	7	7	47.5	5	12	5	6	
44 FT	22	25	14	8	6	6.5	6	7	52.1	42.0	42.0	42.0	7	16	49.0	7	16	35.5	6	6.5	5	6	43.6	117	129	141	7	6.5	47.5	5	12	5	6	0
46 FT	23	26	14	8	6	6	6	7	52.1	43.0	43.0	43.0	6	12	43.5	6	12	30.5	6	7	5	6	43.9	118	130	142	7	6.5	47.5	5	12	5	6	의
48 FT	23	27	15	8	6	6	6	1	53.0	43.0		47.0	6	12	43.5	6	12	30.0	6	1	6	8.5	47.1	119	131	143	1 /	6.5	47.5	5	12	5		<u> </u>
50 FT	24	28	15	8	6	6	6	/	53.0	44.0	44.0	48.0	6	12	43.0	6	12	30.0	6	/	6	8	47.5	120	132	144	_ /	6.5	47.5	5	12	6	8	U



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 9 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 5 THRU 10 FEET

DATE EFFECTIVE: DATE PREPARED:

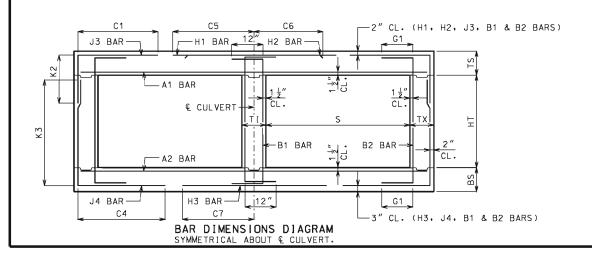
10/01/2011 9/8/2011

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SHEET NO. 12 OF 27

COMMISSION

										SPA	N (S)	=	9 FT			HE	[ GHT	(HT	) = 1	1 F	T OF	12 F	T									
		MEM								TOP	SLAB	BARS									Е	воттом	SLAB E	BARS					WAL	L BA	,RS	
DESIGN		THICK	(NES	S	Α1	BARS			J3 BA	RS			H1 BA	RS		H2 B4	RS	A2	BARS			J4 BAI	RS			НЗ ВА	RS	В1	BARS	B2	2 BARS	_
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		2 HT=12	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4		(3 <b>1</b> HT=12′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	9	10	5	6.5	5	8	48.3	33.0	33.0	5	17	93.0	5	17	29.0	5	9	6	6.5	79.4	138	150	5	6	44.5	5	12	5	9.5	12
2 FT	13	11	9	10	5	6.5	5	7.5	48.3	33.0	33.0	5	16	93.0	5	16	28.0	4	6	6	7	77.0	139	151	5	6	44.5	5	12	5	9	12
4 FT	9	10	9	10	5	8.5	5	6	48.3	29.0	29.0	5	15	93.0	5	15	29.0	5	8	6	6	71.4	138	150	6	7	46.5	5	12	5	8.5	12
6 FT	9	11	9	10	5	8.5	6	7	69.3	29.0	33.0	5	15	47.0	5	15	28.0	5	8.5	6	6	68.0	139	151	5	6	43.0	5	12	5	8.5	12
8 FT	9	11	9	10	5	8.5	6	6.5	61.6	29.0	33.0	5	13	44.0	5	13	27.5	5	7.5	6	6	63.8	139	151	6	7	45.5	5	12	5	8.5	0
10 FT	10	11	10	10	5	8	5	6	56.4	30.0	30.0	5	13	43.0	5	13	27.5	5	7	6	6	60.1	139	151	6	6.5	45.0	5	12	5	8	0
12 FT	11	12	10	10	5	7.5	5	6	55.0	31.0	31.0	5	13	42.5	5	13	27.0	5	6.5	6	6.5	59.1	140	152	6	6.5	45.0	5	12	5	8	0
14 FT	11	13	10	10	5	7.5	6	7	55.6	31.0	35.0	6	16	45.0	6	16	30.0	5	6.5	6	6.5	58.5	141	153	6	6.5	45.0	5	12	5	8	0
16 FT	12	14	11	10	5	7	6	8.5	54.6	32.0	36.0	6	16	44.5	6	16	30.0	5	6.5	6	7	57.4	142	154	6	6.5	45.0	5	12	5	7.5	0
18 FT	13	15	11	10	5	6.5	6	7.5	54.6	33.0	37.0	6	16	44.0	6	16	30.0	5	6.5	G	6.5	57.1	143	155	6	7	44.5	5	12	5	7.5	0
20 FT	13	15	11	10	5	6.5	6	7.5	51.5	33.0	37.0	6	15	43.5	6	15	29.5	5	6	6	6.5	53.4	143	155	6	6.5	44.5	5	12	5	7.5	0
22 FT	14	16	12	10	5	6	6	8	51.9	34.0	38.0	6	16	43.0	6	16	29.5	5	6	G	7.5	53.6	144	156	6	6.5	44.5	5	12	5	7	0
24 FT	15	17	12	10	5	6	6	7.5	58.0	35.0	39.0	6	16	48.5	6	16	35.5	5	6	6	7.5	53.8	145	157	6	6.5	44.5	5	12	5	7	0
26 FT	16	18	13	10	6	8.5	6	7.5	58.5	36.0	40.0	6	15	48.0	6	15	34.5	5	6	6	8	54.0	146	158	6	6.5	44.5	5	12	5	6.5	0
28 FT	17	19	13	10	6	8	6	7	58.6	37.0	41.0	6	14	47.5	6	14	33.5	6	8.5	6	8	54.1	147	159	6	6	44.5	5	12	5	6.5	0
30 FT	17	20	13	10	6	7.5	6	6.5	58.5	37.0	41.0	6	14	47.5	6	14	34.5	6	8	6	7	54.4	148	160	6	6	44.5	5	12	5	6.5	0
32 FT	18	21	14	10	6	7.5	6	7	59.1	38.0	42.0	6	13	47.0	6	13	33.5	6	8	6	8	54.6	149	161	7	7.5	47.5	5	12	5	6	0
34 FT	19	22	14	10	6	7.5	6	6.5	59.3	39.0	43.0	6	13	46.5	6	13	32.5	6	8	6	8	54.9	150	162	7	7.5	47.5	5	12	5	6	0
36 FT	19	22	15	10	6	7	6	6.5	59.5	43.0	43.0	6	13	46.0	6	13	33.0	6	7	6	8	54.9	150	162	7	7.5	48.0	5	12	6	8	0
38 FT	20	23	15	10	6	7	6	6.5	59.6	44.0	44.0	6	12	45.5	6	12	32.0	6	7.5	6	8	55.1	151	163	7	7	47.5	5	12	6	8	0
40 FT	20	24	16	10	6	6	6	6.5	60.0	44.0	44.0	6	12	45.0	6	12	32.5	6	7.5	6	7.5	55.5	152	164	7	7	48.0	5	12	6	8	0
42 FT	21	25	16	10	6	6.5	6	6	60.3	45.0	45.0	6	12	44.5	6	12	31.5	6	7.5	6	7.5	55.8	153	165	7	7	48.0	5	12	6	8	0
44 FT	22	25	17	10	6	6.5	6	6.5	60.8	46.0	46.0	6	12	44.0	6	12	31.0	6	6.5	6	7	55.9	153	165	7	6.5	48.0	5	12	6	7.5	0
46 FT	22	26	17	10	6	6	6	6	60.8	46.0	46.0	6	12	44.0	6	12	31.0	6	7	6	7	56.1	154	166	7	6.5	48.0	5	12	6	7.5	0
48 FT	23	27	18	10	6	6	6	6.5	61.5	47.0	47.0	6	12	43.5	6	12	31.0	6	7	6	6.5	56.6	155	167	7	6.5	48.0	5	12	6	7	0
50 FT	23	28	19	10	6	6	6	6.5	62.0	43.0	47.0	6	12	43.5	6	12	31.0	6	7	6	7	57.0	156	168	7	6.5	48.0	5	12	6	7	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 9 FEET HE[GHT (HT): 11 THRU 12 FEET

DATE EFFECTIVE: DATE PREPARED:

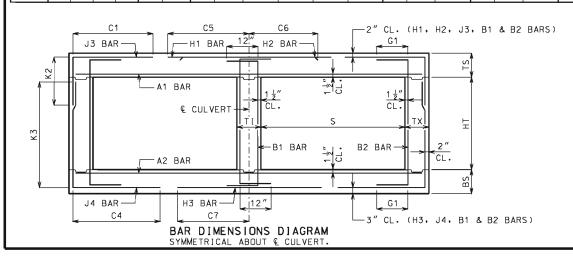
9/8/2011

703.47

SHEET NO. 13 OF 27

										SP	AN (S	) = 1	0 F	Т		HI	I GH	Г (НТ	) =	5 F1	OR	6 F	T OR	7 FT										司
		MEM									TOP SL	AB BAR	S										BOTT	OM SLA	B BAR	S					₩AL	L BA	.RS	
DESIGN		THICK	NESS	5	A1	BARS			J3	BARS				H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1	BARS	B2	2 BARS	5
FILL	TS	вѕ	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	K2 HT=6'	HT=7'	SIZE	SPA.	C5	S I ZE	SPA.	С6	SIZ	E SPA.	SIZE	SPA.	C4	HT=5'	K3 HT=6'	HT=7′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	8	8	5	6.5	4	7	48.9	29.0	29.0	29.0	5	15	98.0	5	15	29.0	4	6	4	7	48.1	66	78	90	5	6	47.5	5	12	5	12	12
2 FT	13	10	8	8	5	6.5	4	7	48.9	29.0	29.0	29.0	5	13	98.0	5	13	28.5	5	8.5	4	6.5	43.8	66	78	90	6	7	50.0	5	12	5	12	12
4 FT	9	10	8	8	5	7.5	6	7.5	43.1	25.0	25.0	25.0	5	12	62.0	5	12	30.0	5	8	4	7	38.9	66	78	90	6	6.5	49.5	5	8.5	5	12	12
6 FT	9	10	8	8	5	8.5	5	6	38.0	25.0	25.0	25.0	6	15	53.5	6	15	32.0	5	7	4	6.5	36.1	66	78	90	6	6	48.5	5	12	5	12	12
8 FT	10	11	8	8	5	8	5	7.5	36.0	26.0	26.0	26.0	6	16	51.0	6	16	31.5	5	7	4	6.5	34.1	67	79	91	6	6	48.0	5	12	5	12	0
10 FT	11	12	8	8	5	7.5	5	8	34.1	27.0	27.0	27.0	6	15	49.5	6	15	31.0	5	6.5	4	6	32.6	68	80	92	6	6.5	48.0	5	12	5	12	0
12 FT	12	13	8	8	5	7	5	8.5	32.8	28.0	28.0	28.0	6	15	48.5	6	15	31.0	5	6.5	4	6	31.5	69	81	93	6	6.5	48.0	5	12	5	12	0
14 FT	13	14	8	8	5	6.5	5	8.5	31.6	29.0	29.0	33.0	6	15	48.5	6	15	31.0	5	6	5	9	30.8	70	82	94	6	6	47.5	5	12	5	12	0
16 FT	14	15	8	8	5	6	5	8.5	30.8	30.0	30.0	34.0	6	14	48.0	6	14	31.0	5	6	5	8.5	30.1	71	83	95	6	6	47.5	5	12	5	12	0
18 FT	15	16	8	8	6	8	5	8	35.1	31.0	31.0	35.0	6	14	53.5	6	14	36.5	6	8	5	8	29.9	72	84	96	6	6	47.5	5	12	5	12	0
20 FT	15	17	8	8	6	7.5	5	8	35.1	31.0	31.0	35.0	6	13	53.5	6	13	36.5	6	8	5	7	29.4	73	85	97	6	6	47.5	5	12	5	12	0
22 FT	16	18	8	8	6	8	5	7	33.4	32.0	36.0	36.0	6	13	52.5	6	13	36.5	6	8	5	6.5	28.0	74	86	98	6	6.5	47.5	5	12	5	12	0
24 FT	17	19	8	8	6	7.5	5	6.5	33.3	37.0	37.0	37.0	6	13	52.5	6	13	36.5	6	8	5	6.5	28.0	75	87	99	6	6	47.5	5	12	5	12	0
26 FT	18	20	8	8	6	7	5	6.5	33.1	38.0	38.0	38.0	6	13	52.0	6	13	36.5	6	8	5	6	28.1	76	88	100	6	6	47.5	5	12	5	10.5	0
28 FT	19	21	8	8	6	7	5	6	33.1	39.0	39.0	39.0	6	13	52.0	6	13	36.0	6	7.5	6	7.5	31.3	77	89	101	7	7.5	50.5	5	12	5	9.5	0
30 FT	20	22	8	8	6	7	6	7.5	37.1	44.0	44.0	44.0	6	12	51.5	6	12	35.5	6	7.5	6	7	31.4	78	90	102	7	7.5	50.5	5	12	5	9.5	0
32 FT	21	23	8	8	6	6.5	6	7	37.1	45.0	45.0	45.0	6	12	51.0	6	12	34.5	6	7.5	6	6.5	31.5	79	91	103	7	7	50.5	5	12	5	9.5	0
34 FT	22	23	8	8	6	6.5	6	6.5	37.0	46.0	46.0	46.0	7	15	55.5	7	15	38.5	6	6.5	6	6.5	31.6	79	91	103	7	7	50.5	5	12	5	9.5	0
36 FT	22	24	8	8	6	6	6	6.5	37.1	46.0	46.0	46.0	7	15	55.5	7	15	39.5	6	7	6	6	31.6	80	92	104	7	7	50.0	5	12	5	9	0
38 FT	23	25	8	8	6	6	6	6	37.1	47.0	47.0	47.0	7	15	55.0	7	15	38.5	6	7	6	6	31.9	81	93	105	7	6.5	50.0	5	12	5	8.5	0
40 FT	24	26	9	8	6	6	6	7	38.0	48.0	48.0	48.0	7	14	54.0	7	14	37.5	6	7	6	6.5	32.5	82	94	106	7	6.5	50.0	5	12	5	8.5	0
42 FT	25	27	9	8	6	6	6	6.5	38.0	49.0	49.0	49.0	7	14	53.5	7	14	37.0	6	7	6	6.5	32.6	83	95	107	7	6	50.0	5	12	5	8.5	0
44 FT	25	28	9	8	7	7.5	6	6.5	38.1	49.0	49.0	49.0	7	14	53.0	7	14	37.5	6	6.5	6	6	32.8	84	96	108	7	6	50.0	5	12	5	8.5	0
46 FT	26	28	9	8	7	7.5	6	6.5	38.1	50.0	50.0	50.0	7	13	52.5	7	13	36.5	6	6.5	6	6	32.9	84	96	108	7	6	50.0	5	12	5	8	0
48 FT	27	29	9	8	7	7.5	6	6	38.1	51.0	51.0	51.0	7	14	51.5	7	14	36.5	6	6.5	6	6	33.0	85	97	109	7	6	50.0	5	12	5	7.5	0
50 FT	27	30	10	8	7	7	6	7	39.0	51.0	51.0	51.0	7	13	51.5	7	13	36.0	6	6.5	6	6.5	33.5	86	98	110	7	6	50.0	5	12	5	8	0

										SP	AN (S	) = 1	0 F	Т		HE	IGH	Г (НТ	) =	8 FT	OR	9 F	T OR	10 F1	Γ									
	١.	MEM									TOP SLA	AB BARS												OM SLA	B BARS	3					₩AL			_
DESIGN		THICK	NESS	5	A1	BARS			J3	BARS				H1 B/	RS		H2 BA	RS	A2	BARS			J4	BARS				нз ва	RS	В1	BARS	B2	2 BARS	_
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10'	S I ZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=8'	K3 HT=9′	HT=10′	S I ZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G	31
1 FT	13	10	8	8	5	6.5	5	8.5	50.9	29.0	33.0	33.0	5	14	100.0	5	14	29.5	5	8.5	6	7.5	71.6	102	114	126	5	6	47.5	5	12	5	12 1	2
2 FT	13	11	8	8	5	6.5	5	8.5	50.9	29.0	33.0	33.0	5	13	100.0	5	13	28.5	5	8.5	5	6	64.1	103	115	127	5	6	47.0	5	12	5	12 1	2
4 FT	9	10	9	8	5	7.5	5	6	69.0	25.0	25.0	29.0	5	12	73.0	5	12	30.0	5	7.5	5	6	55.4	102	114	126	6	6.5	49.5	5	10	5	12 1	2
6 FT	9	10	9	8	5	8.5	5	6	51.4	25.0	29.0	29.0	6	15	54.0	6	15	32.0	5	7	6	7	53.4	102	114	126	6	6	48.5	5	12	5	12 1	2
8 FT	10	11	9	8	5	8	5	6	48.0	26.0	30.0	30.0	5	12	48.0	5	12	28.5	5	7	6	7.5	50.9	103	115	127	6	6	48.0	5	12	5	-	◯
10 FT	11	12	9	8	5	7.5	5	6	46.0	31.0	31.0	31.0	6	16	49.5	6	16	31.0	5	6.5	5	6	46.3	104	116	128	6	6	48.0	5	12	5		ଠା
12 FT	12	13	9	8	5	7	5	6	44.5	32.0	32.0	32.0	6	15	48.5	6	15	31.0	5	6.5	5	6	45.0	105	117	129	6	6	47.5	5	12	5	9.5 (	0
14 FT	13	14	9	8	5	6.5	5	6	43.3	33.0	33.0	33.0	6	15	48.0	6	15	30.5	5	6	5	6	43.9	106	118	130	6	6	47.5	5	12	5		0
16 FT	14	15	9	8	5	6	5	6	42.1	34.0	34.0	34.0	6	15	47.5	6	15	30.5	5	6	5	6	43.0	107	119	131	6	6	47.5	5	12	5		0
18 FT	15	16	10	8	6	8.5	5	6.5	47.1	35.0	35.0	35.0	6	15	53.0	6	15	36.5	6	8	5	7	42.8	108	120	132	6	6	47.5	5	12	5	8.5 (	0
20 FT	15	17	10	8	6	8	6	8	50.6	35.0	35.0	35.0	6	13	52.5	6	13	36.5	6	8	5	6.5	42.3	109	121	133	6	6	47.5	5	12	5	8 (	0
22 FT	16	18	10	8	6	8	5	6	44.5	36.0	36.0	36.0	6	14	52.0	6	14	36.0	6	8	5	7	40.0	110	122	134	6	6.5	47.5	5	12	5		0
24 FT	17	19	10	8	6	7.5	6	8	48.4	37.0	37.0	37.0	6	14	51.5	6	14	36.0	6	8	5	6.5	40.1	111	123	135	6	6	47.5	5	12	5		0
26 FT	18	20	11	8	6	7.5	5	6	45.0	38.0	38.0	38.0	6	13	51.0	6	13	35.5	6	7.5	5	7	40.5	112	124	136	6	6	47.5	5	12	5		0
28 FT	19	21	11	8	6	7	6	8	49.0	39.0	39.0	39.0	6	13	50.5	6	13	35.0	6	7.5	5	7	40.5	113	125	137	7	7.5	50.5	5	12	5		0
30 FT	19	22	12	8	6	6.5	6	8	49.8	39.0	39.0	39.0	6	13	50.0	6	13	35.5	6	7.5	5	6.5	40.9	114	126	138	7	7.5	50.5	5	12	5		<u> </u>
32 FT	20	23	12	8	6	6.5	6	8	49.6	40.0	40.0	40.0	6	12	49.5	6	12	34.5	6	7.5	5	6.5	41.0	115	127	139	7	7	50.5	5	12	5		의
34 FT	21	24	12	8	6	6.5	6	7.5	49.6	41.0	41.0	41.0	6	12	49.0	6	12	33.5	6	7.5	5	6.5	41.1	116	128	140	7	7	50.5	5	12	5		의
36 FT	22	25	12	8	6	6.5	6	6.5	49.6	42.0	42.0	42.0	7	15	53.0	7	15	38.0	6	7	5	6.5	41.3	117	129	141	7	6.5	50.5	5	12	5		<u> </u>
38 FT	23	26	13	8	6	6	6	7.5	50.4	43.0	43.0	43.0	7	15	52.0	7	15	37.0	6	7	5	6	41.8	118	130	142	7	6.5	50.5	5	12	5		<u></u>
40 FT	23	26	13	8	6	6	6	7	50.3	43.0	43.0	43.0	7	15	52.0	7	15	37.5	6	6.5	5	6	41.6	118	130	142	7	6.5	50.5	5	12	5		<u></u>
42 FT	24	27	14	8	6	6	6	7.5	51.0	44.0	44.0	44.0	7	14	51.5	7	14	36.5	6	6.5	5	6	42.1	119	131	143	7	6	50.5	5	12	5		0
44 FT	24	28	14	8	7	7	6	7	51.1	44.0	44.0	44.0	7	14	51.5	7	14	37.0	6	6.5	5	6	42.1	120	132	144	7	6	50.5	5	12	5		0
46 FT	25	29	14	8	7	7.5	6	6.5	51.1	45.0	49.0	49.0	7	14	51.0	7	14	36.0	6	6.5	6	8.5	45.4	121	133	145	7	6	50.5	5	12	5		
48 FT	26	30	14	8	7	7	6	6	51.1	46.0	50.0	50.0	7	15	50.5	7	15	36.0	6	6.5	6	8	45.6	122	134	146	7	6	50.5	5	12	5		
50 FT	26	30	15	8	7	7	6	6.5	51.9	50.0	50.0	50.0	7	14	50.5	7	14	36.0	6	6	6	8	45.8	122	134	146	8	7.5	56.5	5	12	6	8 (	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 10 FEET HE[GHT (HT): 5 THRU 10 FEET

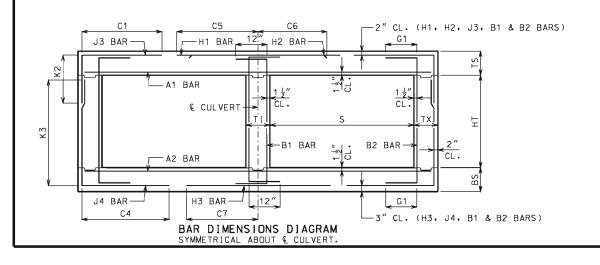
DATE EFFECTIVE: DATE PREPARED:

: 10/01/2011 : 9/8/2011

703.47

SHEET NO. 14 OF 27

										SPAI	N (S)	= 10	FΤ			HE:	IGHT	(HT)	= '	11 FT	OR	12	FT OR	13 F	T									$\equiv$
		MEM									TOP SL	AB BARS	5										BOTT	OM SLA	B BAR	S					₩AL	L BA	RS	
DESIGN		THICK	(NES	S	Α1	BARS			J3	BARS				H1 B	RS		H2 BA	RS	A2	BARS			J4	BARS				нз ва	RS	B1 I	BARS	B2	2 BARS	5
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	K2 HT=12'	HT=13'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=11'	K3 HT=12'	HT=13	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	10	9	10	5	6.5	5	6.5	51.9	33.0	33.0	33.0	5	14	101.0	5	14	30.0	5	7.5	6	6	85.4	138	150	162	6	7	51.0	5	12	5	8.5	12
2 FT	13	11	9	10	5	6.5	5	6	51.9	33.0	33.0	33.0	5	13	101.0	5	13	29.0	5	8	6	6	82.6	139	151	163	5	6	47.5	5	12	5	8.5	12
4 FT	9	10	10	10	5	7.5	6	7	52.5	29.0	29.0	33.0	5	12	101.5	5	12	30.5	5	7	6	6	74.5	138	150	162	6	6	50.0	5	10	5	8	12
6 FT	9	11	10	10	5	8.5	6	7	70.4	29.0	29.0	33.0	5	12	50.5	5	12	29.5	5	7	6	6	71.0	139	151	163	6	6.5	49.5	5	12	5	8	12
8 FT	10	12	11	10	5	8	5	6	62.6	30.0	30.0	30.0	5	12	47.5	5	12	29.0	5	7	5	6	64.6	140	152	164	6	6.5	48.5	5	12	5	7.5	0
10 FT	11	12	11	10	5	7.5	5	6.5	60.9	31.0	31.0	31.0	5	12	46.5	5	12	28.5	5	6.5	6	6.5	64.4	140	152	164	6	6	48.0	5	12	5	7.5	0
12 FT	11	13	11	10	5	7.5	6	7.5	60.6	31.0	31.0	35.0	6	15	48.5	6	15	31.5	5	6	6	6.5	63.6	141	153	165	6	6	48.0	5	12	5	7.5	0
14 FT	12	14	11	10	5	7	6	7.5	59.6	32.0	32.0	36.0	6	14	48.0	6	14	31.5	5	6	6	6.5	62.5	142	154	166	6	6	48.0	5	12	5	7.5	0
16 FT	13	15	12	10	5	6.5	6	7.5	58.4	33.0	33.0	37.0	6	14	47.5	6	14	31.0	6	8	6	7	61.1	143	155	167	6	6	48.0	5	12	5	7	0
18 FT	14	16	12	10	5	6	6	7	58.0	34.0	38.0	38.0	6	14	47.0	6	14	31.0	6	8	6	6.5	60.5	144	156	168	6	6.5	48.0	5	12	5	7	0
20 FT	15	17	13	10	6	8	6	7	64.0	35.0	39.0	39.0	6	14	52.5	6	14	37.0	6	8	6	6.5	59.9	145	157	169	6	6.5	48.0	5	12	5	6.5	0
22 FT	15	18	13	10	6	7.5	6	7	61.1	35.0	35.0	39.0	6	13	52.0	6	13	37.0	6	8	6	7.5	57.4	146	158	170	6	6.5	48.0	5	12	5	6.5	0
24 FT	16	19	13	10	6	7.5	6	6.5	61.3	36.0	36.0	40.0	6	13	51.5	6	13	36.5	6	7.5	6	7.5	57.4	147	159	171	6	6	48.0	5	12	5	6.5	0
26 FT	17	20	14	10	6	7.5	6	7	61.8	37.0	37.0	41.0	6	13	51.5	6	13	36.5	6	7.5	6	7.5	57.6	148	160	172	6	6	48.0	5	12	5	6	0
28 FT	18	21	14	10	6	7	6	6.5	61.9	38.0	38.0	42.0	6	13	51.0	6	13	36.5	6	7.5	6	7.5	57.8	149	161	173	7	7.5	51.0	5	12	5	6	0
30 FT	19	22	15	10	6	7	6	6.5	62.4	39.0	43.0	43.0	6	13	50.0	6	13	35.5	6	7.5	6	7.5	58.0	150	162	174	7	7.5	51.0	5	12	6	8	0
32 FT	20	23	15	10	6	7	6	6	62.5	44.0	44.0	44.0	6	12	49.5	6	12	34.5	6	7	6	7.5	58.1	151	163	175	7	7	51.0	5	12	6	8	0
34 FT	21	24	16	10	6	6.5	6	6.5	63.0	41.0	45.0	45.0	6	12	48.5	6	12	33.5	6	7	6	7.5	58.5	152	164	176	7	7	51.0	5	12	6	8	0
36 FT	21	25	16	10	6	6	6	6	62.9	45.0	45.0	45.0	6	12	48.5	6	12	34.0	6	7	6	7.5	58.6	153	165	177	7	6.5	51.0	5	12	6	8	0
38 FT	22	26	17	10	6	6.5	6	6	63.5	42.0	46.0	46.0	7	15	52.5	7	15	38.5	6	7	6	7	59.0	154	166	178	7	6.5	51.0	5	12	6	7.5	0
40 FT	23	26	17	10	6	6	6	6	63.5	47.0	47.0	47.0	7	15	52.0	7	15	37.5	6	6	6	7	58.9	154	166	178	7	6.5	51.0	5	12	6	7.5	0
42 FT	24	27	18	10	6	6	6	6	64.1	44.0	48.0	48.0	7	15	51.5	7	15	37.0	6	6.5	6	6.5	59.3	155	167	179	7	6	51.0	5	12	6	7	0
44 FT	24	28	19	10	7	8	6	6	64.6	44.0	48.0	48.0	7	14	51.5	7	14	37.0	6	6.5	6	6.5	59.6	156	168	180	7	6	51.0	5	12	6	7	0
46 FT	25	29	19	10	7	7.5	6	6	64.8	49.0	49.0	49.0	7	15	51.0	7	15	36.5	6	6.5	6	6.5	59.9	157	169	181	7	6	51.0	5	12	6	6.5	0
48 FT	25	30	20	10	7	7.5	7	8	70.3	49.0	49.0	49.0	7	15	51.0	7	15	36.5	6	6.5	6	6.5	60.3	158	170	182	7	6	51.0	5	12	6	6.5	0
50 FT	26	31	20	10	7	7	7	7	70.4	50.0	50.0	50.0	7	15	50.5	7	15	36.5	6	6	6	6	60.5	159	171	183	7	6	51.0	5	12	6	6.5	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 10 FEET
HE[GHT (HT): 11 THRU 13 FEET

DATE EFFECTIVE: DATE PREPARED:

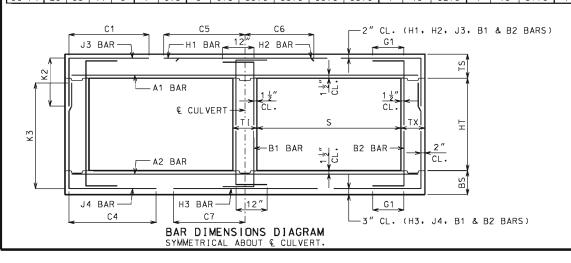
9/8/2011

703.47

SHEET NO. 15 OF 27

										SP	AN (S	) = 1	1 F	Т		H[	I GH	Г (НТ	) =	6 F1	OR	7 F	T OR	8 FT										靣
		MEM					TOP SLAB BARS						S										BOTT	OM SLA	B BARS	5					₩AL	L BA	RS	
DESIGN	1	THICK	(NESS	5	A1	BARS	TOP SL  BARS J3 BARS  SPA SIZE SPA C1 K2						H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	В1	BARS	Ba	2 BARS	<u>;                                    </u>	
FILL	TS	ВЅ	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'		HT=8'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZ	E SPA.	SIZE	SPA.	C4	HT=6'	K3 HT=7'	HT=8′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	8	5	6	4	6.5	52.5	30.0	30.0	30.0	5	13	106.5	5	13	30.0	5	8	5	7	52.9	78	90	102	6	7	53.5	5	12	5	12	12
2 FT	14	11	8	8	5	6	4	6	52.5	30.0	30.0	30.0	5	12	106.5	5	12	29.0	5	8	5	8	49.1	79	91	103	6	7	53.0	5	12	5	12	12
4 FT	10	10	8	8	5	7	5	6	45.6	26.0	26.0	30.0	6	16	72.5	6	16	35.0	5	7	5	6.5	43.0	78	90	102	6	6	52.5	5	10.5	5	12	12
6 FT	10	11	8	8	5	7.5	5	6	40.8	26.0	26.0	30.0	6	15	58.5	6	15	33.5	5	6.5	5	7.5	39.5	79	91	103	6	6	52.0	5	12	5	12	12
8 FT	11	12	8	8	5	7.5	5	7	38.6	27.0	27.0	31.0	6	15	54.5	6	15	33.0	5	6.5	5	8	37.3	80	92	104	6	6	51.5	5	12	5	12	0
10 FT	12	13	8	8	5	7	5	7.5	36.6	28.0	28.0	32.0	6	14	53.0	6	14	32.5	5	6	5	8	35.6	81	93	105	6	6	51.0	5	12	5	12	0
12 FT	13	14	8	8	5	6.5	5	7.5	35.3	29.0	33.0	33.0	6	14	52.0	6	14	32.5	6	8.5	5	8.5	34.6	82	94	106	6	6	51.0	5	12	5	12	0
14 FT	14	15	8	8	5	6	5	8	34.1	30.0	34.0	34.0	6	13	51.5	6	13	32.0	6	8	5	8.5	33.8	83	95	107	6	6	51.0	5	12	5	12	0
16 FT	15	16	8	8	6	8	5	7.5	38.3	31.0	35.0	35.0	6	13	57.0	6	13	38.0	6	7.5	5	8	33.1	84	96	108	6	6	51.0	5	12	5	12	0
18 FT	16	17	8	8	6	8	5	7	37.5	32.0	36.0	36.0	6	12	56.5	6	12	38.0	6	7	5	7	32.6	85	97	109	7	7	53.5	5	12	5	10.5	0
20 FT	17	18	8	8	6	7.5	5	6.5	37.1	37.0	37.0	37.0	6	12	56.5	6	12	38.0	6	7	5	6.5	32.4	86	98	110	7	7	53.5	5	12	5	9.5	0
22 FT	18	20	8	8	6	7	5	6.5	37.1	38.0	38.0	38.0	6	12	56.0	6	12	37.5	6	7.5	5	6	32.4	88	100	112	6	6	50.5	5	12	5	9.5	0
24 FT	19	20	8	8	6	6.5	5	6	35.1	39.0	39.0	39.0	6	12	55.0	6	12	37.5	6	7	5	6	30.9	88	100	112	6	6	50.5	5	12	5	9.5	0
26 FT	20	21	8	8	6	6.5	6	7.5	39.1	44.0	44.0	44.0	6	12	54.5	6	12	37.5	6	6.5	6	7.5	33.9	89	101	113	7	7	53.5	5	12	5	9.5	0
28 FT	21	22	8	8	6	6.5	6	7	39.1	45.0	45.0	45.0	6	12	54.5	6	12	37.0	6	6	6	7	34.0	90	102	114	7	7	53.5	5	12	5	9.5	0
30 FT	22	23	8	8	6	6	6	6.5	39.1	46.0	46.0	46.0	7	15	59.0	7	15	41.0	6	6	6	6.5	34.1	91	103	115	7	7	53.5	5	12	5	8.5	0
32 FT	23	24	8	8	6	6	6	6	39.1	47.0	47.0	47.0	7	15	58.5	7	15	40.5	6	6	6	6	34.3	92	104	116	7	7	53.5	5	12	5	8	0
34 FT	23	26	9	8	7	7.5	6	7	40.3	47.0	47.0	47.0	7	15	58.0	7	15	41.0	6	6.5	6	6.5	34.8	94	106	118	7	6.5	53.5	5	12	5	8.5	0
36 FT	24	27	9	8	7	7.5	6	7	40.3	48.0	48.0	48.0	7	14	57.5	7	14	40.5	6	6.5	6	6.5	34.9	95	107	119	7	6	53.5	5	12	5	8	0
38 FT	25	27	9	8	7	7.5	6	6.5	40.1	49.0	49.0	49.0	7	14	57.0	7	14	39.5	6	6	6	6.5	35.0	95	107	119	7	6	53.5	5	12	5	7.5	0
40 FT	26	28	10	8	7	7.5	6	7	40.9	50.0	50.0	50.0	7	13	56.0	7	13	38.5	6	6	6	7	35.5	96	108	120	7	6	53.5	5	12	5	8	0
42 FT	27	29	10	8	7	7	6	7	41.0	51.0	51.0	51.0	7	13	55.0	7	13	37.5	6	6	6	6.5	35.8	97	109	121	8	7.5	59.5	5	12	5	8	0
44 FT	27	30	11	8	7	6.5	5	6	37.9	47.0	47.0	47.0	7	13	54.5	7	13	38.0	6	6	6	7	36.1	98	110	122	8	7.5	59.5	5	12	5	7.5	0
46 FT	28	31	11	8	7	6.5	6	7.5	41.9	52.0	52.0	52.0	7	12	54.0	7	12	37.5	6	6	6	7	36.4	99	111	123	8	7	59.5	5	12	5	7.5	0
48 FT	29	32	11	8	7	6.5	6	7	41.9	53.0	53.0	53.0	7	12	53.5	7	12	37.0	6	6	6	6.5	36.5	100	112	124	8	7	59.0	5	12	5	7.5	0
50 FT	29	33	11	8	7	6.5	6	7	42.0	53.0	53.0	53.0	7	12	53.5	7	12	37.0	6	6	6	6.5	36.6	101	113	125	8	7	59.0	5	12	5	7	0

										SPAI	N (S)	= 11	FΤ			HE.	IGHT	(HT)	= 9	FT	OR	10 F	T OR	11 F	Τ									
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	B BAR	S					₩AL	L BA	RS	
DESIGN	لكار	THICK	(NES	S	A1 I	BARS			J3	BARS				H1 BA	\RS		H2 BA	RS	Α2	BARS			J4	BARS				нз ва	RS	B1	BARS	B2	2 BARS	,
FILL	TS	BS	TX	ті	S I 7F	SPA.	S I 7F	SPA.	C1		K2		SIZE	SPA.	C5	ST7F	SPA.	C6	SIZE	SPA.	S I 7F	SPA.	C4		K3		SIZE	SPA.	C7	SIZE	SPA.	S I 7F	SPA.	G1
	<u> </u>									HT=9'	K2 HT=10′	HT=11'													HT=10'	H1=11						$\vdash$		
1 FT	14	10	8	9	5	6	5	- 8	54.6	34.0	34.0	34.0	5	13		5	13	30.5	5	7.5	6	6	76.4	114	126	138	6	6.5	54.0	5	12	5	10	12
2 FT	14	11	8	9	5	6	5	8	54.6	34.0	34.0	34.0	5	12	109.0	5	12	29.5	5	7.5	6	6.5	71.8	115	127	139	6	7	53.5	5	12	5	10	12
4 FT	10	10	9	9	5	7	5	6	82.4	30.0	30.0	30.0	6	16	84.0	6	16	35.0	5	7	6	6.5	62.1	114	126	138	7	7	55.5	5	10.5	5	10	12
6 FT	10	11	9	9	5	7.5	5	6	56.3	30.0	30.0	30.0	6	15	58.5	6	15	33.5	5	6.5	6	6.5	58.1	115	127	139	6	6	52.0	5	12	5		12
8 FT	11	12	10	9	5	7.5	5	6	52.4	31.0	31.0	31.0	6	15	54.5	6	15	33.0	5	6	5	6	52.1	116	128	140	6	6	51.5	5	12	5		<u> </u>
10 FT	11	13	10	9	5	7.5	5	6	49.6	31.0	31.0	31.0	6	14	52.5	6	14	32.5	5	6	5	6	50.5	117	129	141	6	6	51.5	5	12	5	9.5	0
12 FT	12	14	10	9	5	6.5	5	6	48.1	32.0	32.0	32.0	6	13	52.0	6	13	32.5	6	8	5	6	49.0	118	130	142	6	6	51.0	5	12	5	9	9
14 FT	14	15	10	9	5	6	5	6	47.1	34.0	34.0	34.0	6	14	51.5	6	14	32.5	6	8	5	6	47.9	119	131	143	6	6	51.0	5	12	5	8	9
16 FT	15	16	10	9	6	8	6	8	55.0	35.0	35.0	35.0	6	13	57.0	6	13	38.5	6	7.5	5	6	46.9	120	132	144	6	6	51.0	5	12	5	8	0
18 FT	16	17	10	9	6	8	6	7.5	53.9	36.0	36.0	40.0	6	13	56.5	6	13	38.0	6	1	6	1	49.0	121	133	145	6	6	51.0	5	12	5	8	$\stackrel{\circ}{\rightarrow}$
20 FT	17	18	11	9	6	7.5	6	8	54.0	37.0	37.0	37.0	ь	13	56.0	6	13	38.0	6	6.5	5	6	45.9	122	134	146	6	6	51.0	5	12	5	7.5	$\stackrel{\circ}{\rightarrow}$
22 FT	18	20	12	9	6	7	6	8	54.4	38.0	38.0	38.0	6	13	55.5	6	13	38.0	6	7.5	5	6.5	46.0	124	136	148	6	6	51.0	5	12	5	17-	쒸
24 FT	18	20	12	9	6	(	6	8	52.1	38.0	38.0	38.0	6	12	54.5	6	12	37.5	6	6.5	5	6.5	43.5	124	136	148	6	6	51.0	5	12	5	7.5	씟
26 FT 28 FT	19	22	12	9	6	6.5	6	7.5	52.1	39.0	39.0	39.0	6	12	54.5	6	12	37.5 37.5	6	7	5	6.5	43.6	126 127	138 139	150 151	7	7.5	54.0	5 5	12	5	7	$\frac{\circ}{}$
30 FT	21	24	13	9	6	6	6	7.5	52.8	41.0	41.0	41.0	6	12	53.0	6	12	37.0	6	6.5	5	6	44.1	128	140	152	7	7	54.0	5	12	+-	6.5	쒸
30 FT	22	25	13	9	6	6	6	7.5	52.8	42.0	42.0	42.0	7	15	56.5	7	15	41.0	6	6.5	5	6	44.3	129	141	153	7	6.5	54.0	5	12	5	6.5	兴
34 FT	23	26	13	9	6	6	6	6.5	52.8	43.0	43.0	43.0	7	15	57.0	<del>                                     </del>	15	40.0	6	6.5	5	6	44.4	130	142	154	7	6.5	54.0	5	12	5	6.5	픴
36 FT	24	27	14	9	7	8	6	7	53.4	44.0	44.0	44.0	7	14	56.0	<del>-</del>	14	39.5	6	6.5	5	6	44.8	131	143	155	7	6	54.0	5	12		6	픴
38 FT	25	28	14	9	7	7.5	6	7	53.4	45.0	45.0	45.0	7	14	55.0	7	14	38.5	6	6.5	5	6	44.9	132	144	156	7	6	54.0	5	12	5	6	픴
40 FT	25	29	14	9	7	7	6	6	53.4	45.0	49.0	49.0	7	14	55.0	7	14	39.0	6	6	6	8.5	47.9	133	145	157	8	7.5	60.0	5	12	5	6	$\stackrel{\circ}{\vdash}$
42 FT	26	30	15	9	7	7	6	6.5	54.1	50.0	50.0	50.0	7	13	54.0	7	13	38.0	6	6	6	8	48.4	134	146	158	8	7.5	60.0	5	12	6	8	퓐
44 FT	27	31	15	9	7	7	6	6.5	54.1	51.0	51.0	51.0	7	13	54.0	7	13	37.0	6	6	6	7.5	48.6	135	147	159	8	7	60.0	5	12	6	8	$\overline{d}$
46 FT	27	32	16	9	7	6.5	6	6.5	55.0	51.0	51.0	51.0	7	13	53.5	7	13	37.5	6	6	6	7.5	48.9	136	148	160	8	7	60.0	5	12	6	8	<del>-</del>
48 FT	28	32	16	9	7	6.5	6	6	54.9	52.0	52.0	52.0	7	13	53.0	7	13	37.0	7	8	6	7.5	49.0	136	148	160	8	7	60.0	5	12	6	8	0
50 FT	29	33	17	9	7	6.5	6	6.5	55.6	53.0	53.0	53.0	7	13	52.5	7	13	37.0	7	7.5	6	7	49.5	137	149	161	8	7	60.0	5	12	6		<del>0</del>
20 1 1	123	55	1.1	,		0.5		0.5	1 22.0	1 33.0	1 22.0	1 22.0		1 1 2	1 22.3		1 1 3	131.0	_	1 1 . 3		_ '	177.7	131	173	101		_ '	00.0		1 ' -		1	



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 11 FEET HE[GHT (HT): 6 THRU 11 FEET

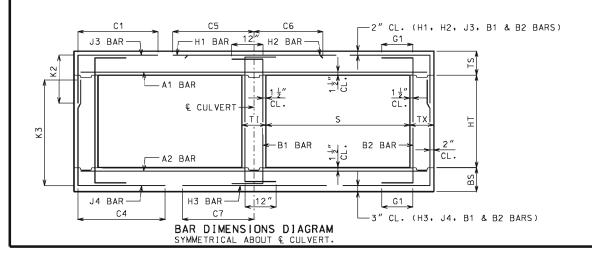
DATE EFFECTIVE: DATE PREPARED:

: 10/01/2011 : 9/8/2011

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7 | SHEET NO. 16 OF 27

										SPAI	V (S)	= 11	FT			HE I	GHT	(HT)	= '	12 FT	OR	13	FT OR	14 F	T									$\overline{\neg}$
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	B BAR	S					₩AL	L BA	RS	
DESIGN		THICK	(NES	S	Α1	BARS			J3	BARS				H1 B/	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1	BARS	В2	2 BARS	3
FILL	TS	вѕ	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=12'	K2 HT=13'	HT=14'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=12'	K3 HT=13'	HT=14	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	12	9	11	5	6	5	6	55.6	34.0	34.0	34.0	5	13	110.0	5	13	30.5	5	8	6	6	94.6	152	164	176	5	6	51.5	5	12	5	8.5	12
2 FT	14	12	9	11	5	6	6	7.5	55.6	34.0	34.0	38.0	5	12	110.0	5	12	30.0	5	7.5	6	6	89.4	152	164	176	5	6	51.0	5	12	5	8.5	12
4 FT	10	12	10	11	5	7	6	7	58.3	30.0	30.0	34.0	6	16	112.5	6	16	35.5	5	7	6	6.5	83.4	152	164	176	6	7	53.5	5	11.5	5	8	12
6 FT	10	12	10	11	5	7.5	6	6.5	78.8	30.0	34.0	34.0	6	15	57.5	6	15	34.0	5	6.5	6	6	77.1	152	164	176	6	6.5	52.5	5	12	5	7.5	12
8 FT	10	13	10	11	5	7.5	6	6	70.1	34.0	34.0	34.0	6	14	54.0	6	14	33.5	5	6	6	6	74.1	153	165	177	6	6.5	52.0	5	12	5	7	0
10 FT	11	13	11	11	5	7.5	6	7	67.0	31.0	31.0	35.0	6	14	52.5	6	14	33.0	5	6	6	6	69.9	153	165	177	6	6	51.5	5	12	5	7.5	0
12 FT	12	14	12	11	5	7	6	8	64.6	32.0	32.0	36.0	6	14	51.5	6	14	33.0	6	8	6	7	67.6	154	166	178	6	6	51.5	5	12	5	7	0
14 FT	13	15	12	11	5	6.5	6	7	63.4	33.0	37.0	37.0	6	13	51.0	6	13	33.0	6	7.5	6	6.5	66.4	155	167	179	6	6	51.0	5	12	5	7	0
16 FT	14	16	13	11	5	6	6	7	62.3	34.0	38.0	38.0	6	13	51.0	6	13	33.0	6	7	6	7	64.8	156	168	180	6	6	51.0	5	12	5	6.5	0
18 FT	15	17	13	11	6	8	6	6.5	67.6	35.0	39.0	39.0	6	12	56.5	6	12	38.5	6	6.5	6	6	63.8	157	169	181	6	6	51.0	5	12	5	6.5	0
20 FT	16	19	14	11	6	8	6	6.5	67.4	36.0	40.0	40.0	6	12	56.0	6	12	38.5	6	7.5	6	6.5	63.8	159	171	183	6	6	51.5	5	12	5	6	0
22 FT	17	20	14	11	6	7.5	6	6	67.3	37.0	41.0	41.0	6	12	55.5	6	12	38.5	6	7	6	6	63.5	160	172	184	6	6	51.0	5	12	5	6	0
24 FT	18	21	15	11	6	7	6	6.5	67.4	42.0	42.0	42.0	6	12	55.0	6	12	38.5	6	7	6	6.5	63.4	161	173	185	7	7.5	54.5	5	12	6	8	0
26 FT	19	22	15	11	6	6.5	6	6.5	65.3	43.0	43.0	43.0	6	13	54.5	6	13	38.0	6	7	6	7	61.1	162	174	186	7	7.5	54.0	5	12	6	8	0
28 FT	20	23	15	11	6	6.5	6	6	65.3	44.0	44.0	44.0	6	12	54.0	6	12	38.0	6	7	6	6.5	61.3	163	175	187	7	7	54.0	5	12	6	8	0
30 FT	21	24	16	11	6	6.5	6	6	65.8	45.0	45.0	45.0	6	12	53.0	6	12	37.0	6	6.5	6	7	61.4	164	176	188	7	7	54.0	5	12	6	8	0
32 FT	22	25	16	11	6	6	7	7.5	70.8	46.0	46.0	46.0	7	15	57.5	7	15	41.0	6	6.5	6	6.5	61.6	165	177	189	7	6.5	54.0	5	12	6	8	0
34 FT	23	26	17	11	6	6	6	6	66.4	47.0	47.0	47.0	7	15	56.5	7	15	40.0	6	6.5	6	7	61.9	166	178	190	7	6.5	54.5	5	12	6	7.5	0
36 FT	23	27	17	11	7	7.5	7	7	71.3	47.0	47.0	47.0	7	15	56.5	7	15	41.0	6	6.5	6	6.5	62.0	167	179	191	7	6	54.5	5	12	6	7.5	0
38 FT	24	28	18	11	7	7.5	7	7.5	71.8	48.0	48.0	48.0	7	14	55.5	7	14	40.0	6	6	6	6.5	62.4	168	180	192	7	6	54.5	5	12	6	7	0
40 FT	25	29	19	11	7	7.5	7	7.5	72.4	49.0	49.0	49.0	7	14	55.0	7	14	39.0	6	6	6	6.5	62.6	169	181	193	8	7.5	60.5	5	12	6	6.5	0
42 FT	26	30	19	11	7	7.5	7	7	72.5	50.0	50.0	50.0	7	13	54.5	7	13	38.0	6	6	6	6.5	62.9	170	182	194	8	7.5	60.5	5	12	6	6.5	0
44 FT	27	31	20	11	7	7	7	7.5	73.0	51.0	51.0	51.0	7	14	54.0	7	14	38.0	6	6	6	6	63.3	171	183	195	8	7	60.5	5	12	6	6.5	0
46 FT	28	32	20	11	7	7	7	6.5	73.1	52.0	52.0	52.0	7	14	53.5	7	14	38.0	6	6	6	6	63.5	172	184	196	8	7	60.5	5	12	6	6.5	0
48 FT	28	32	21	11	7	6.5	7	6.5	73.6	52.0	52.0	52.0	7	14	53.5	7	14	37.5	7	7	6	6	63.5	172	184	196	8	7	60.5	5	12	6	6	0
50 FT	28	33	22	11	7	6.5	7	6.5	74.1	52.0	52.0	52.0	7	13	53.5	7	13	37.5	7	7.5	6	6	63.9	173	185	197	8	7	60.5	5	12	6	6	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 11 FEET HE [GHT (HT): 12 THRU 14 FEET

DATE EFFECTIVE: DATE PREPARED:

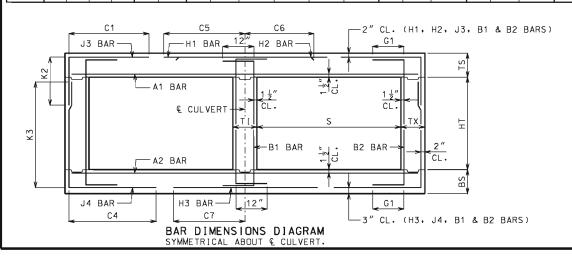
10/01/2011 9/8/2011

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SHEET NO. 17 OF 27

										SP	AN (S	) = 1	2 F	Т		HE	E I GH	T (HT	) =	6 F T	OR	7 F	T OR	8 FT									
		MEM									TOP SL	AB BARS												OM SLA	B BAR	S					₩AL		
DESIGN.		THICK	NESS	5	Α1	BARS			J3	BARS				H1 B/	ARS		H2 B/	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1 I	BARS	B2	2 BARS
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	K2 HT=7'	HT=8'	S I ZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=6'	K3 HT=7'	HT=8'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G
1 FT	14	10	8	8	5	6	4	6	56.1	30.0	30.0	30.0	5	12	115.0	5	12	31.5	5	7.5	5	6.5	52.4	78	90	102	6	6.5	56.5	5	12	5	12 12
2 FT	15	11	8	8	6	8	4	6.5	59.1	31.0	31.0	31.0	6	16	118.0	6	16	39.0	5	7.5	5	7.5	47.9	79	91	103	6	6.5	56.0	5	12	5	12 12
4 FT	11	10	8	8	5	6.5	5	7	43.6	31.0	31.0	31.0	6	15	77.5	6	15	36.5	5	6.5	5	6	42.6	78	90	102	7	6.5	58.5	5	12	5	12 12
6 FT	11	11	8	8	5	7	5	6.5	40.9	27.0	31.0	31.0	6	14	63.0	6	14	35.0	5	6.5	5	7	39.3	79	91	103	7	6.5	57.5	5	12	5	12 12
8 FT	11	13	8	8	5	7	5	6	39.1	27.0	27.0	31.0	6	12	58.0	6	12	34.0	5	6	5	8.5	36.3	81	93	105	6	6	54.5	5	12	5	12 0
10 FT	12	14	8	8	5	6.5	5	6.5	37.0	28.0	28.0	32.0	6	12	56.5	6	12	33.5	6	8	5	8.5	34.5	82	94	106	6	6	54.5	5	12	5	12 0
12 FT	14	15	8	8	5	6	5	8	34.6	30.0	34.0	34.0	6	13	55.5	6	13	33.5	6	7.5	5	8.5	33.8	83	95	107	7	7	57.0	5	12	5	12 0
14 FT	15	16	8	8	6	8	5	7.5	38.4	31.0	35.0	35.0	6	12	61.0	6	12	39.5	6	7.5	5	8	32.9	84	96	108	7	7	57.0	5	12	5	12 0
16 FT	16	17	8	8	6	8	5	7	37.5	32.0	36.0	36.0	7	16	65.5	7	16	44.5	6	7	5	7	32.3	85	97	109	7	6.5	57.0	5	12	5	12 0
18 FT	17	19	8	8	6	7.5	5	6.5	37.0	37.0	37.0	37.0	7	15	65.0	7	15	44.0	6	7	5	6.5	31.6	87	99	111	7	7	57.0	5	12	5	10.5 0
20 FT	18	20	8	8	6	7	5	6.5	36.4	38.0	38.0	38.0	7	15	64.5	7	15	44.0	6	6.5	5	6	31.3	88	100	112	7	7	57.0	5	12	5	9.5 0
22 FT	19	21	8	8	6	6	5	6	36.0	39.0	39.0	39.0	7	14	64.0	7	14	44.0	6	6.5	6	7.5	34.1	89	101	113	7	7	57.0	5	12	5	9.5 0
24 FT	21	22	8	8	6	6	6	7	39.6	45.0	45.0	45.0	7	15	63.5	7	15	44.0	6	6.5	6	7	34.4	90	102	114	7	7	56.5	5	12	5	9.5 0
26 FT	21	23	8	8	6	6	6	7	38.3	45.0	45.0	45.0	7	14	63.0	7	14	43.5	6	6.5	6	6.5	32.8	91	103	115	7	7	56.5	5	12	5	9.5 0
28 FT	23	24	8	8	6	6	6	6	38.3	47.0	47.0	47.0	7	15	62.0	7	15	43.0	6	6	6	6	33.0	92	104	116	7	7	56.5	5	12	5	9 0
30 FT	23	25	8	8	7	7	6	6	38.3	47.0	47.0	47.0	7	14	62.0	7	14	43.5	6	6	6	6	33.0	93	105	117	7	6.5	56.5	5	12	5	8.5 0
32 FT	25	27	9	8	7	7.5	6	6.5	39.1	49.0	49.0	49.0	7	14	61.0	7	14	41.5	6	6	6	6.5	33.8	95	107	119	7	6	56.5	5	12	5	8.5 0
34 FT	25	28	9	8	7	6.5	6	6.5	39.3	49.0	49.0	49.0	7	13	61.0	7	13	42.5	6	6	6	6	33.8	96	108	120	7	6	56.5	5	12	5	8.5 0
36 FT	26	29	9	8	7	6.5	6	6.5	39.3	50.0	50.0	50.0	7	13	60.0	7	13	41.5	6	6	6	6	33.9	97	109	121	8	7.5	62.5	5	12	5	8 0
38 FT	27	30	10	8	7	6.5	6	7	40.1	51.0	51.0	51.0	7	13	59.0	7	13	41.0	6	6	6	6.5	34.5	98	110	122	8	7.5	62.5	5	12	5	8 0
40 FT	28	31	10	8	7	6.5	6	6.5	40.1	52.0	52.0	52.0	7	12	58.5	7	12	40.0	7	8	6	6	34.6	99	111	123	8	7	62.5	5	12	5	8 0
42 FT	29	32	10	8	7	6.5	6	6.5	40.1	53.0	53.0	53.0	7	12	57.5	7	12	39.0	7	8	6	6	34.9	100	112	124	8	7	62.5	5	12	5	7.5 0
44 FT	30	33	10	8	7	6.5	6	6	40.3	54.0	54.0	54.0	7	12	56.5	7	12	38.5	7	7.5	7	6.5	38.1	101	113	125	8	6.5	62.0	5	12	5	7 0
46 FT	31	34	10	8	7	6	6	6	40.3	55.0	55.0	55.0	8	15	64.0	8	15	45.5	7	7.5	7	6.5	38.3	102	114	126	8	6.5	62.0	5	12	5	6.5 0
48 FT	31	34	11	8	7	6	6	6.5	41.0	55.0	55.0	55.0	8	15	64.0	8	15	46.0	7	6.5	6	6	35.6	102	114	126	8	6.5	62.5	5	12	5	7.5 0
50 FT	32	35	11	8	8	7.5	6	6.5	41.0	56.0	56.0	56.0	8	15	63.5	8	15	45.5	7	7	6	6	35.8	103	115	127	8	6.5	62.0	5	12	5	7 0

ll										SPA	N (S)	= 12	FΤ			HE:	IGHT	(HT)	= 5	9 FT	OR	10 F	T OR	11 F	Τ									
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	AB BAR	S					₩AL	L BA	RS	
DESIGN		THICK	NES:	S	A1	BARS			J3	BARS				Н1 ВА	ıRS		H2 BA	RS	A2	BARS			J4	BARS				нз ва	ıRS	B1 E	BARS	B2	2 BARS	
FILL	TS	BS	TX	ΙΤ	SIZE	SPA.	SIZE	SPA.	C1	нт-а′	K2 HT=10'	HT=11'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=9'	K3 HT=10'	HT=11	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G	:1
1 FT	14	11	8	9	5	6	5	8	58.3	34.0	34.0	34.0	5	12	117.5	5	12	32.0	5	7.5	6	6.5	77.5	115	127	139	6	7	57.0	5	12	5	10 1	ᅱ
2 FT	15	12	8	9	6	8	5	8	62.3	35.0	35.0	35.0	6	16	121.5	6	16	39.5	5	7.5	6	7	71.9	116	128	140	6	7	56.5	5	12	5		2
4 FT	11	11	9	9	5	6.5	6	7	76.1	31.0	31.0	35.0	6	15	86.0	6	15	37.0	5	6.5	6	7	61.8	115	127	139	6	6	56.0	5	11.5		10.5 1	_
6 FT	11	12	9	9	5	7	6	7	59.0	31.0	31.0	35.0	6	14	63.0	6	14	35.5	5	6	6	7	57.6	116	128	140	6	6	55.0	5	12	5	.	2
8 FT	11	13	9	9	5	7	6	7	54.0	31.0		35.0	6	13	58.0	6	13	34.5	5	6	6	7	54.5	117	129	141	6	6	55.0	5	12	5	9.5 0	_
10 FT	12	14	10	9	5	7	5	6	49.0	32.0	32.0	32.0	6	12	56.0	6	12	34.0	6	8	5	6.5	49.3	118	130	142	7	7	57.5	5	12	5	10 0	5
12 FT	13	15	10	9	5	6.5	6	7.5	50.1	33.0		33.0	6	12	55.0	6	12	33.5	6	7.5	5	6.5	47.6	119	131	143	7	7	57.5	5	12	5	9 (	5
14 FT	15	16	10	9	6	8	5	6	50.6	35.0	35.0	35.0	6	12	60.5	6	12	39.5	6	7	5	6	46.4	120	132	144	7	7	57.0	5	12	5	8 (	5
16 FT	16	17	10	9	6	8	6	7.5	53.8	36.0	36.0	36.0	6	12	60.0	6	12	39.5	6	6.5	5	6	45.4	121	133	145	7	6.5	57.0	5	12	5	8 0	5
18 FT	17	19	10	9	6	7.5	6	7	53.1	37.0	37.0	41.0	7	16	64.5	7	16	44.5	6	7	6	7.5	47.8	123	135	147	7	7	57.0	5	12	5	8 0	5
20 FT	18	20	11	9	6	7	6	7.5	53.1	38.0	38.0	38.0	7	15	64.0	7	15	44.0	6	6.5	5	6	44.6	124	136	148	7	7	57.0	5	12	5	7.5 0	5
22 FT	19	21	12	9	6	6.5	6	7.5	53.5	39.0	39.0	39.0	7	15	63.5	7	15	44.0	6	6.5	5	6.5	44.8	125	137	149	7	7	57.0	5	12	5	7.5 0	5
24 FT	20	23	12	9	6	6.5	6	7	53.4	40.0	40.0	40.0	7	15	63.0	7	15	44.0	6	6.5	5	6.5	44.6	127	139	151	7	7	57.0	5	12	5	7 (	5
26 FT	21	23	12	9	6	6	6	7.5	51.4	41.0	41.0	41.0	7	15	62.0	7	15	43.5	6	6	5	6.5	42.8	127	139	151	7	7	57.0	5	12	5	7 (	J.
28 FT	22	25	12	9	6	6	6	7	51.4	42.0	42.0	42.0	7	15	61.5	7	15	43.5	6	6.5	5	6.5	42.9	129	141	153	7	6.5	57.0	5	12	5	7 (	5
30 FT	23	26	12	9	7	7.5	6	6.5	51.3	43.0	43.0	43.0	7	15	61.0	7	15	43.5	6	6	5	6	43.0	130	142	154	7	6.5	57.0	5	12	5	7 (	Л
32 FT	24	27	13	9	7	7.5	6	7	52.0	44.0	44.0	44.0	7	14	60.5	7	14	42.5	6	6	5	6	43.4	131	143	155	7	6	57.0	5	12	5	6.5	7
34 FT	25	28	13	9	7	7	6	7	52.0	45.0	45.0	45.0	7	14	59.5	7	14	41.5	6	6	5	6	43.5	132	144	156	7	6	57.0	5	12	5	6.5	Л
36 FT	26	29	13	9	7	7	6	6	51.9	46.0	50.0	50.0	7	13	58.5	7	13	41.0	6	6	6	8.5	46.6	133	145	157	8	7.5	63.0	5	12	5	6.5	<u>.                                    </u>
38 FT	27	30	14	9	7	7	6	6.5	52.6	47.0	51.0	51.0	7	13	57.5	7	13	40.0	7	8	6	8	47.1	134	146	158	8	7.5	63.0	5	12	5	6 (	)
40 FT	28	31	14	9	7	6.5	6	6.5	52.6	52.0	52.0	52.0	7	12	56.5	7	12	39.0	7	7.5	6	7.5	47.3	135	147	159	8	7	63.0	5	12	5	6 (	5
42 FT	28	32	15	9	7	6	6	6.5	53.5	52.0	52.0	52.0	7	12	56.5	7	12	39.5	7	7.5	6	7.5	47.5	136	148	160	8	7	63.0	5	12	6	8 0	)
44 FT	29	33	15	9	7	6	6	6.5	53.4	53.0	53.0	53.0	7	12	56.0	7	12	38.5	7	7.5	6	7	47.8	137	149	161	8	6.5	63.0	5	12	6	8 0	0
46 FT	30	34	15	9	7	6	6	6	53.4	54.0	54.0	54.0	7	12	55.5	7	12	38.0	7	7.5	6	7	47.9	138	150	162	8	6.5	63.0	5	12	6	8 0	0
48 FT	31	35	16	9	7	6	6	6.5	54.1	55.0	55.0	55.0	7	12	55.0	7	12	37.5	7	7	6	6.5	48.4	139	151	163	8	6.5	63.0	5	12	6	8 0	
50 FT	31	36	16	9	8	7.5	6	6	54.3	55.0	55.0	55.0	7	12	55.0	7	12	37.5	7	7	6	6.5	48.4	140	152	164	8	6.5	63.0	5	12	6	8 0	)



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET HE[GHT (HT): 6 THRU 11 FEET

DATE EFFECTIVE: DATE PREPARED:

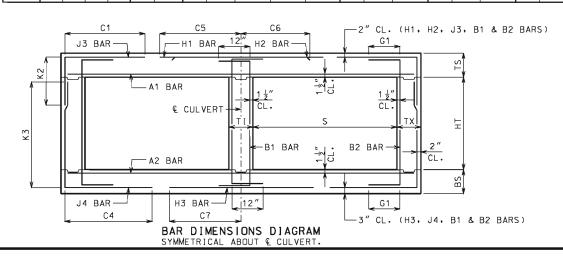
10/01/2011 9/8/2011

703.47

SHEET NO. 18 OF 27

										SPAN	(S)	= 1	2 FT			HE	IGHT	(HT	) = 1	2 F	T OR	13 F	Т								
		MEM								TOP	SLAB	BARS									Е	BOTTOM	SLAB E	BARS					WAL	L BA	RS
DESIGN		THIC	(NES	S	A1	BARS			J3 BA	RS			Н1 ВА	.RS		H2 BA	RS	A2	BARS			J4 BAI	RS			НЗ ВА	RS	B1 I	BARS	В2	2 BARS
FILL	TS	BS	ΤX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	K HT=12'	2 HT=13	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K HT=12 '	3 HT=13′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G1
1 FT	14	11	9	10	5	6	5	6.5	59.0	34.0	34.0	5	12	118.0	5	12	32.5	5	7	6	6	88.9	151	163	6	6.5	57.5	5	12	5	8.5 12
2 FT	15	12	9	10	6	8	5	7	63.0	35.0	35.0	6	16	122.0	6	16	39.5	5	7	6	6	83.6	152	164	6	7	57.0	5	12	5	8.5 12
4 FT	11	12	9	10	5	6.5	6	7	61.0	35.0	35.0	6	15	120.0	6	15	37.0	5	6.5	6	6	76.5	152	164	6	6.5	56.5	5	12	5	8.5 12
6 FT	11	12	9	10	5	7	6	6.5	73.5	35.0	35.0	6	14	63.5	6	14	35.5	5	6	6	6	70.0	152	164	6	6	55.5	5	12	5	8.5 12
8 FT	11	13	10	10	5	7	6	7	63.9	31.0	35.0	6	13	58.0	6	13	34.5	5	6	6	6.5	65.8	153	165	6	6	55.0	5	12	5	8 0
10 FT	12	14	10	10	5	7	6	7	61.6	36.0	36.0	6	12	56.5	6	12	34.5	6	8	6	6	63.1	154	166	7	7	57.5	5	12	5	8 0
12 FT	13	15	11	10	5	6.5	6	7.5	59.9	33.0	37.0	6	12	55.0	6	12	34.0	6	7.5	6	6.5	61.4	155	167	7	7	57.5	5	12	5	7.5 0
14 FT	14	16	12	10	5	6	6	7.5	58.8	34.0	38.0	6	12	54.5	6	12	34.0	6	7	6	7.5	60.0	156	168	7	7	57.5	5	12	5	7 0
16 FT	16	18	12	10	6	8	6	7	64.1	36.0	40.0	6	12	60.0	6	12	40.0	6	7	6	7.5	59.5	158	170	6	6	54.0	5	12	5	7 0
18 FT	17	19	12	10	6	7.5	6	6.5	63.1	37.0	41.0	6	12	59.5	6	12	39.5	6	7	6	6.5	58.5	159	171	7	7	57.0	5	12	5	7 0
20 FT	18	20	13	10	6	7	6	6.5	62.6	38.0	42.0	6	12	58.5	6	12	39.5	6	6.5	6	7.5	57.9	160	172	7	7	57.0	5	12	5	6.5 0
22 FT	19	21	13	10	6	6.5	6	6.5	62.3	39.0	43.0	7	16	63.0	7	16	44.5	6	6	6	6.5	57.5	161	173	7	7	57.0	5	12	5	6.5 0
24 FT	20	23	14	10	6	6.5	6	6.5	62.5	40.0	44.0	7	16	62.5	7	16	44.0	6	6.5	6	7.5	57.8	163	175	7	7	57.0	5	12	5	6 0
26 FT	21	24	14	10	6	6	6	6	62.3	41.0	45.0	7	15	62.0	7	15	44.0	6	6.5	6	7	57.6	164	176	7	7	57.0	5	12	5	6 0
28 FT	22	25	14	10	6	6	6	6	59.8	42.0	46.0	7	15	61.0	7	15	43.5	6	6.5	6	7.5	55.1	165	177	7	6.5	57.0	5	12	5	6 0
30 FT	23	26	15	10	7	8	6	6	60.3	47.0	47.0	7	15	60.0	7	15	42.5	6	6	6	7.5	55.4	166	178	7	6.5	57.0	5	12	6	8 0
32 FT	24	27	15	10	7	7.5	6	6	60.3	48.0	48.0	7	14	59.5	7	14	42.0	6	6	6	7.5	55.5	167	179	7	6	57.0	5	12	6	8 0
34 FT	25	28	16	10	7	7.5	6	6	60.9	49.0	49.0	7	14	58.5	7	14	41.0	6	6	6	7.5	55.8	168	180	7	6	57.0	5	12	6	8 0
36 FT	25	29	16	10	7	6.5	7	7.5	65.8	49.0	49.0	7	13	58.5	7	13	41.5	6	6	6	7.5	55.8	169	181	8	7.5	63.0	5	12	6	8 0
38 FT	26	30	17	10	7	7	6	6	61.5	50.0	50.0	7	13	57.5	7	13	40.5	7	7.5	6	7	56.1	170	182	8	7.5	63.0	5	12	6	7.5 0
40 FT	27	31	17	10	7	6.5	7	7.5	66.5	51.0	51.0	7	13	57.0	7	13	40.0	7	7.5	6	7	56.3	171	183	8	7	63.0	5	12	6	7.5 0
42 FT	28	32	18	10	7	6.5	7	7.5	67.1	52.0	52.0	7	12	56.5	7	12	39.0	7	7.5	6	6.5	56.6	172	184	8	7	63.0	5	12	6	7 0
44 FT	29	33	18	10	7	6.5	7	7	67.1	53.0	53.0	7	12	56.0	7	12	38.0	7	7.5	6	6.5	56.9	173	185	8	6.5	63.0	5	12	6	7 0
46 FT	29	34	19	10	7	6	7	7.5	67.9	53.0	53.0	7	12	56.0	7	12	38.5	7	7.5	6	6.5	57.0	174	186	8	6.5	63.0	5	12	6	6.5 0
48 FT	30	35	19	10	7	6	7	6.5	67.9	54.0	54.0	7	12	55.0	7	12	38.0	7	7	6	6.5	57.3	175	187	8	6.5	63.0	5	12	6	6.5 0
50 FT	31	36	20	10	7	6	7	7	68.6	55.0	55.0	7	13	54.5	7	13	37.5	7	7	6	6.5	57.6	176	188	8	6	63.0	5	12	6	6.5 0

										SPAN			2 FT			HE	IGHT	(HT	) = '	14 F												
	Ι.	MEM		_							SLAB	BARS									В	MOTTO		BARS					₩AL			
DESIGN		THICK	.NES	S	A1	BARS			J3 BA				H1 BA	RS		H2 B4	RS	A2	BARS			J4 BA	_			нз ва	RS	B1	BARS	B2	2 BARS	3
FILL	TS	BS	ΤX	ΤI	S I ZE	SPA.	SIZE	SPA.	C1	HT=14'	.2 HT=15	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	K HT=14'		S I ZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	12	10	12	5	6	5	6	60.0	34.0	34.0	5	12	119.0	5	12	32.5	5	7	6	6	98.8	176	188	6	7	58.0	5	12	5	8	12
2 FT	15	12	10	12	6	8	6	8	67.0	35.0	39.0	6	16	126.0	6	16	40.0	5	6.5	6	6	92.5	176	188	6	6.5	57.0	5	12	5	8	12
4 FT	11	13	10	12	5	6.5	6	6.5	62.0	35.0	35.0	6	16	121.0	6	16	37.5	5	6.5	6	6	89.8	177	189	6	7	57.0	5	12	5	7	12
6 FT	11	13	11	12	5	7	6	7	83.8	31.0	35.0	6	15	61.0	6	15	36.0	5	6	6	6.5	81.4	177	189	6	6.5	56.0	5	12	5	7	12
8 FT	11	13	12	12	5	7	6	7.5	73.9	35.0	35.0	6	13	57.5	6	13	35.0	5	6	6	6.5	76.1	177	189	7	7	58.0	5	12	5	7	0
10 FT	12	14	12	12	5	7	6	7	71.4	36.0	36.0	6	13	56.0	6	13	35.0	6	8	6	6.5	74.1	178	190	7	7	58.0	5	12	5	7	0
12 FT	13	15	13	12	5	6.5	6	7.5	68.8	37.0	37.0	6	13	55.0	6	13	34.5	6	7.5	6	6.5	71.6	179	191	7	7	57.5	5	12	5	6.5	0
14 FT	14	16	13	12	5	6	6	6.5	67.3	38.0	38.0	6	12	54.5	6	12	34.5	6	6.5	6	6	70.1	180	192	7	7	57.5	5	12	5	6.5	0
16 FT	15	18	14	12	6	8	6	6.5	72.1	39.0	39.0	6	12	60.0	6	12	40.5	6	7	6	6.5	69.5	182	194	6	6	54.5	5	12	5	6	0
18 FT	17	19	14	12	6	7.5	6	6	72.1	41.0	41.0	6	12	59.5	6	12	40.5	6	6.5	6	6	68.1	183	195	6	6	54.5	5	12	5	6	0
20 FT	18	20	15	12	6	7	6	6	71.5	42.0	42.0	6	12	59.0	6	12	40.0	6	6.5	6	6	67.1	184	196	7	7	57.5	5	12	6	8	0
22 FT	19	22	16	12	6	6.5	6	6	71.4	43.0	43.0	6	12	58.5	6	12	40.0	6	6.5	6	6	67.4	186	198	7	7	57.5	5	12	6	8	0
24 FT	20	23	16	12	6	6.5	6	6	71.3	44.0	44.0	6	12	58.0	6	12	40.0	6	6.5	6	6	67.1	187	199	7	7	57.5	5	12	6	8	0
26 FT	21	24	17	12	6	6	6	6	71.4	45.0	45.0	6	12	57.0	6	12	39.5	6	6	6	6	67.1	188	200	7	7	57.5	5	12	6	7.5	0
28 FT	22	25	17	12	6	6	6	6	69.1	46.0	46.0	7	15	61.5	7	15	44.0	6	6	6	6.5	64.9	189	201	7	6.5	57.5	5	12	6	7.5	0
30 FT	23	26	17	12	6	6	7	7.5	74.1	47.0	47.0	7	15	61.0	7	15	43.0	6	6	6	6.5	64.9	190	202	7	6.5	57.5	5	12	6	7.5	0
32 FT	23	27	17	12	7	7	7	6.5	74.0	47.0	47.0	7	14	61.0	7	14	44.0	6	6	6	6	65.0	191	203	7	6	57.5	5	12	6	7.5	0
34 FT	24	28	18	12	7	7	7	7	74.5	48.0	48.0	7	14	60.0	7	14	43.0	6	6	6	6	65.3	192	204	7	6	57.5	5	12	6	7	0
36 FT	25	29	19	12	7	7	7	7	75.0	49.0	49.0	7	14	59.0	7	14	42.0	7	7.5	6	6.5	65.5	193	205	8	7.5	63.5	5	12	6	6.5	0
38 FT	26	30	20	12	7	7	7	7.5	75.5	50.0	50.0	7	13	58.0	7	13	41.5	7	7.5	6	6	65.9	194	206	8	7.5	63.5	5	12	6	6.5	0
40 FT	27	31	20	12	7	7	7	6.5	75.6	51.0	51.0	7	13	57.5	7	13	40.5	7	7.5	6	6	66.0	195	207	8	7	63.5	5	12	6	6.5	0
42 FT	28	32	21	12	7	6.5	7	7	76.3	52.0	52.0	7	12	57.0	7	12	39.5	7	7	6	6	66.4	196	208	8	7	63.5	5	12	6	6	0
44 FT	28	33	22	12	7	6.5	7	7	76.6	52.0	58.0	7	12	57.0	7	12	40.0	7	7	7	7.5	69.6	197	209	8	6.5	63.5	5	12	6	6	0
46 FT	29	34	22	12	7	6.5	7	6	76.8	53.0	59.0	7	12	56.5	7	12	39.0	7	7	7	7.5	69.9	198	210	8	6.5	63.5	5	12	6	6	0
48 FT	30	35	24	12	7	6	7	7	78.0	54.0	60.0	7	12	56.0	7	12	39.0	7	7	7	7.5	70.4	199	211	8	6.5	64.0	5	12	6	6	0
50 FT	30	36	24	12	7	6	7	6	78.0	54.0	60.0	7	12	56.0	7	12	39.0	7	7	7	7.5	70.5	200	212	8	6	64.0	5	12	7 !	8	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 12 FEET HE[GHT (HT): 12 THRU 15 FEET

DATE EFFECTIVE: DATE PREPARED:

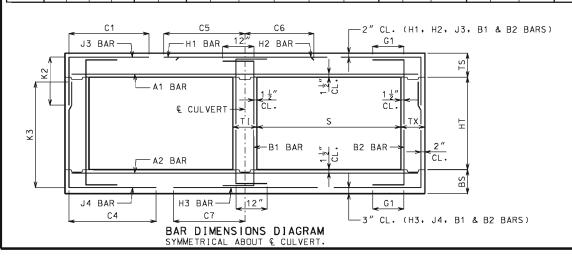
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19 OF 27

										SP	AN (S	) = 1	3 F	Τ		HE	I GH	T (HT	) =	7 F1	OR	8 F	T OR	9 FT										亍
		MEM									TOP SL	AB BARS	5										BOTT	OM SLA	AB BAR	S					WAL	L BA	.RS	
DESIGN	1	THICK	NESS	S	Α1	BARS			J3	BARS				H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1	BARS	В2	2 BARS	
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	K2 HT=8'	HT=9'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8	8	5	6	5	8.5	61.8	30.0	34.0	34.0	5	12	125.5	5	12	36.5	5	7	6	7	61.0	90	102	114	6	6	60.0	5	12	5	12	12
2 FT	15	12	8	8	6	8	5	8	65.8	31.0	35.0	35.0	6	16	129.5	6	16	43.5	5	7	5	7	53.8	92	104	116	6	6.5	59.5	5	12	5	12	12
4 FT	11	11	8	8	6	8	6	7	52.1	31.0	31.0	31.0	6	13	82.0	6	13	38.0	5	6.5	5	6	46.5	91	103	115	7	6.5	62.0	5	11	5	12	12
6 FT	12	12	8	8	5	6.5	5	6.5	44.1	32.0	32.0	32.0	6	13	68.0	6	13	36.5	5	6	5	6.5	42.8	92	104	116	7	6.5	61.0	5	12	5	12	12
8 FT	12	13	8	8	5	6	5	6	41.5	32.0	32.0	32.0	7	16	65.0	7	16	38.5	5	6	5	6.5	40.0	93	105	117	7	6.5	60.5	5	12	5	12	0
10 FT	13	15	8	8	5	6	5	6	39.5	29.0	33.0	33.0	7	15	63.0	7	15	38.0	6	7.5	5	8	38.0	95	107	119	7	7	60.5	5	12	5	12	0
12 FT	15	16	8	8	6	8	5	6.5	42.4	35.0	35.0	35.0	7	16	70.0	7	16	46.0	6	7	5	7.5	37.1	96	108	120	7	6.5	60.0	5	12	5	11	0
14 FT	16	17	8	8	6	8	5	6	41.1	36.0	36.0	36.0	7	15	69.0	7	15	46.0	6	7	5	7	36.1	97	109	121	7	6.5	60.0	5	12	5	10	0
16 FT	17	18	8	8	6	7.5	5	6	40.1	37.0	37.0	37.0	7	14	68.5	7	14	45.5	6	6	5	6.5	35.4	98	110	122	7	6.5	60.0	5	12	5	9.5	0
18 FT	18	20	8	8	6	6.5	6	8	43.5	38.0	38.0	38.0	7	14	68.0	7	14	45.5	6	6.5	5	6	34.8	100	112	124	7	6.5	60.0	5	12	5	9.5	0
20 FT	20	21	8	8	6	6.5	6	7.5	42.6	44.0	44.0	44.0	7	14	67.0	7	14	45.5	6	6	6	7.5	37.5	101	113	125	7	6.5	60.0	5	12	5	9	0
22 FT	21	23	8	8	6	6	6	6.5	42.5	45.0	45.0	45.0	7	14	66.5	7	14	45.0	6	6	6	6.5	37.3	103	115	127	7	6.5	60.0	5	12	5	8	0
24 FT	22	24	9	8	6	6	6	7.5	43.1	42.0	42.0	46.0	7	13	66.0	7	13	45.0	6	6	6	7	37.6	104	116	128	7	6.5	60.0	5	12	5	8.5	0
26 FT	23	25	9	8	7	7.5	6	6.5	42.9	47.0	47.0	47.0	7	13	65.5	7	13	45.0	6	6	6	7	37.6	105	117	129	7	6.5	60.0	5	12	5	8.5	0
28 FT	24	26	9	8	7	7.5	6	7	41.3	48.0	48.0	48.0	7	13	64.5	7	13	44.5	7	8	6	6.5	36.1	106	118	130	7	6.5	59.5	5	12	5	8.5	0
30 FT	25	27	9	8	7	7	6	6	41.3	49.0	49.0	49.0	7	13	64.0	7	13	44.5	7	7.5	6	6.5	36.3	107	119	131	7	6	59.5	5	12	5	7.5	0
32 FT	26	29	10	8	7	7	6	7	42.3	50.0	50.0	50.0	7	13	63.5	7	13	44.0	7	8	6	6.5	36.9	109	121	133	8	7.5	65.5	5	12	5	8	0
34 FT	27	30	10	8	7	6.5	6	6.5	42.3	51.0	51.0	51.0	7	13	62.5	7	13	43.5	7	7.5	6	6.5	37.0	110	122	134	8	7.5	65.5	5	12	5	7.5	0
36 FT	28	31	11	8	7	6.5	6	7.5	43.1	52.0	52.0	52.0	7	12	62.0	7	12	42.5	7	7.5	6	7	37.5	111	123	135	8	7	65.5	5	12	5	7.5	0
38 FT	29	32	11	8	7	6	6	7	43.1	53.0	53.0	53.0	7	12	61.0	7	12	41.5	7	7.5	6	6.5	37.6	112	124	136	8	7	65.5	5	12	5	7.5	0
40 FT	30	33	11	8	7	6	6	7	43.1	54.0	54.0	54.0	7	12	60.0	7	12	41.0	7	7	6	6.5	37.9	113	125	137	8	6.5	65.5	5	12	5	7	0
42 FT	31	34	12	8	7	6	6	7.5	44.0	55.0	55.0	55.0	8	15	67.0	8	15	48.0	7	7	6	7	38.4	114	126	138	8	6.5	65.5	5	12	5	7	0
44 FT	32	35	12	8	8	7.5	6	7	44.0	56.0	56.0	56.0	8	14	66.5	8	14	47.0	7	7	6	6.5	38.5	115	127	139	8	6.5	65.5	5	12	5	7	0
46 FT	33	36	12	8	8	7	6	7	44.0	57.0	57.0	57.0	8	14	66.0	8	14	46.0	7	7	6	6.5	38.8	116	128	140	8	6	65.5	5	12	5	6.5	0
48 FT	33	37	12	8	8	6.5	6	7	44.0	57.0	57.0	57.0	8	13	66.0	8	13	46.5	7	6.5	6	6.5	38.8	117	129	141	8	6	65.5	5	12	5	6.5	0
50 FT	34	38	12	8	8	7	6	6	44.0	58.0	58.0	58.0	8	14	65.0	8	14	46.0	7	6.5	6	6	39.0	118	130	142	8	6	65.5	5	12	5	6	0

										SPAI	N (S)	= 13	FΤ			HE:	I GHT	(HT)	= '	10 FT	OR	<b>1</b> 1	FT OF	12 F	- T								
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	AB BAR	S					₩AL	L BAI	RS
DESIGN		THICK	(NES	S	A1	BARS			J3	BARS				H1 B4	ıRS		H2 BA	RS	A2	BARS			J4	BARS				нз ва	RS	B1 I	3ARS	B2	2 BARS
FĪLL	TS	BS	TX	ΙΤ	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	K2 HT=11'	HT=12'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=10'	K3 HT=11′	1HT=12	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G1
1 FT	14	11	9	10	5	6	5	7.5	62.6	34.0	34.0	34.0	5	12	126.5	5	12	36.5	5	6.5	6	6.5	81.1	127	139	151	6	6.5	60.5	5	11.5	5	9.5 12
2 FT	15	12	9	10	6	8	5	7.5	66.6	35.0	35.0	35.0	6	16	130.5	6	16	43.5	5	6.5	6	6.5	75.6	128	140	152	6	6.5	60.0	5	12	5	9 12
4 FT	11	11	9	10	6	8	6	7	78.5	35.0	35.0	35.0	6	13	84.0	6	13	38.0	5	6.5	6	6	66.3	127	139	151	7	6.5	62.0	5	9	5	8.5 12
6 FT	12	12	9	10	5	6.5	6	6.5	63.6	32.0	36.0	36.0	6	13	67.0	6	13	37.0	5	6	6	6	61.5	128	140	152	7	6.5	61.5	5	12	5	8.5 12
8 FT	12	14	9	10	5	6	6	6.5	58.3	32.0	32.0	36.0	6	12	61.5	6	12	36.0	6	8	6	6.5	59.1	130	142	154	7	7	61.0	5	12	5	8.5 0
10 FT	13	15	9	10	5	6	6	6	55.4	33.0	33.0	37.0	7	15	63.0	7	15	38.5	6	7.5	6	6.5	56.6	131	143	155	7	7	61.0	5	12	5	8.5 0
12 FT	14	16	10	10	5	6	6	6.5	53.6	34.0	34.0	38.0	7	15	61.5	7	15	38.5	6	7	6	7	54.6	132	144	156	7	6.5	60.5	5	12	5	8 0
14 FT	16	17	10	10	6	8	6	7	58.0	36.0	36.0	40.0	7	15	69.0	7	15	46.5	6	7	6	6.5	53.3	133	145	157	7	6.5	60.5	5	12	5	8 0
16 FT	17	19	11	10	6	7.5	6	7	57.5	37.0	37.0	41.0	7	15	68.5	7	15	46.0	6	6.5	6	8	52.4	135	147	159	7	7	60.5	5	12	5	7.5 0
18 FT	18	20	12	10	6	7	6	7.5	57.4	38.0	38.0	38.0	7	14	68.0	7	14	46.0	6	6.5	5	6	48.8	136	148	160	7	6.5	60.5	5	12	5	7 0
20 FT	19	21	12	10	6	6.5	6	7	56.6	39.0	39.0	43.0	7	14	67.5	7	14	46.0	6	6	6	8	51.1	137	149	161	7	6.5	60.5	5	12	5	7 0
22 FT	21	23	12	10	6	6	6	6.5	56.1	41.0	41.0	45.0	7	14	66.5	7	14	45.5	6	6	6	7.5	51.0	139	151	163	7	6.5	60.5	5	12	5	7 0
24 FT	22	24	13	10	6	6	6	7	56.5	42.0	42.0	46.0	7	14	66.0	7	14	45.5	6	6	6	8	51.1	140	152	164	7	6.5	60.5	5	12	5	6.5 0
26 FT	23	25	13	10	7	7.5	6	6.5	56.3	43.0		47.0	7	14	65.5	7	14	45.5	7	7.5	6	7.5	51.0	141	153	165	7	6.5	60.5	5	12	-	6.5 0
28 FT	24	26	13	10	7	7.5	6	6.5	54.4	44.0		48.0	7	14	64.5	7	14	45.0	7	7.5	6	8	49.1	142	154	166	7	6.5	60.0	5	12	5	6.5 0
30 FT	25	28	13	10	7	7	6	6	54.4	45.0		49.0	7	14	64.0	7	14	45.0	7	8	6	8	49.3	144	156	168	7	6	60.0	5	12	5	6.5 0
32 FT	26	29	14	10	7	7	6	6.5	55.1	46.0	50.0	50.0	7	13	63.5	7	13	44.0	7	7.5	6	8.5	49.8	145	157	169	8	7.5	66.0	5	12	5	6 0
34 FT	27	30	14	10	7	6.5	6	6	55.0	47.0	51.0	51.0	7	13	62.5	7	13	43.0	7	7.5	6	8	49.8	146	158	170	8	7.5	66.0	5	12	5	6 0
36 FT	28	31	15	10	7	6.5	6	6.5	55.8	52.0	52.0	52.0	7	12	61.5	7	12	42.5	7	7	6	7.5	50.3	147	159	171	8	7	66.0	5	12	6	8 0
38 FT	29	32	15	10	7	6	6	6	55.6	53.0		53.0	7	12	60.5	7	12	41.5	7	7	6	7.5	50.4	148	160	172	8	7	66.0	5	12	6	8 0
40 FT	_	33	16	10	7	6	6	6	56.4	54.0	54.0	54.0	7	12	59.5	7	12	41.0	7	6.5	6	7	50.8	149	161	173	8	6.5	66.0	5	12	6	8 0
42 FT	31	35	16	10	7	6	6	6	56.5	55.0	55.0	55.0	8	15	67.0	8	15	48.0	7	7	6	6.5	51.0	151	163	175	8	6.5	66.0	5	12	6	8 0
44 FT	31	35	16	10	8	7	7	7.5	61.4	55.0	55.0	55.0	8	14	67.0	8	14	48.5	7	6	6	6.5	50.9	151	163	175	8	6.5	66.0	5	12	6	8 0
46 FT	32	36	17	10	8	7.5	6	6	57.1	56.0	56.0	56.0	8	14	66.5	8	14	47.5	7	6	6	6.5	51.4	152	164	176	8	6	66.0	5	12	6	7.5 0
48 FT			17	10	8	7	7	7.5	62.1	57.0	57.0	57.0	8	14	66.0	8	14	47.0	7	6	6	6.5	51.5	153	165	177	8	6	66.0	5	12		7.5 0
50 FT	34	38	17	10	8	7	7	7	62.1	58.0	58.0	58.0	8	14	65.5	8	14	46.5	7	6	6	6	51.8	154	166	178	8	6	66.0	5	12	6	7.5 0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET HE[GHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: DATE PREPARED:

10/01/2011 9/8/2011

703.47

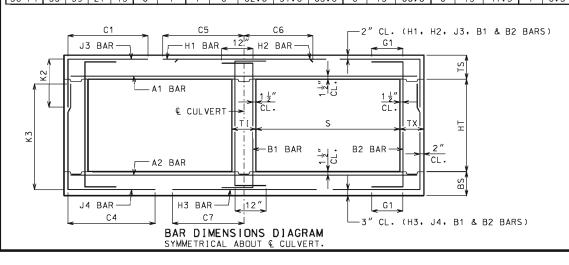
SHEET NO. 20 OF 27

COMMISSION

MISSOURI HIGHWAYS AND TRANSPORTATION

										SPAN	(S)	= 1	3 FT			HE	IGHT	(HT	) = 1	13 F	T OR	14 F	T									
		MEM								TOP	SLAB	BARS									Е	BOTTOM	SLAB E	BARS					₩AL	L BAI	RS	
DESIGN	1	LH [ Ck	(NES	5	A1	BARS			J3 BA	RS			Н1 ВА	RS		H2 BA	RS	A2	BARS			J4 BA	₹S			H3 BA	RS	B1	BARS	B2	2 BARS	
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	K HT=13'	2 HT=14	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K HT=13'		SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA. G	; 1
1 FT	14	11	11	11	5	6	5	7	64.1	34.0	34.0	5	12	127.5	5	12	36.5	5	6.5	5	6	85.3	163	175	6	6	60.5	5	12	5	8 1:	2
2 FT	15	12	11	11	6	8	5	7	68.1	35.0	35.0	6	16	131.5	6	16	43.5	5	6.5	5	6	80.9	164	176	6	6.5	60.0	5	12	5	7.5 13	2
4 FT	11	12	11	11	5	6	5	6	92.9	31.0	31.0	6	13	82.5	6	13	38.0	5	6	5	6	75.5	164	176	7	7	62.5	5	11.5	5	7.5 13	2
6 FT	11	12	11	11	5	6	6	7.5	74.6	31.0	35.0	6	12	64.5	6	12	37.0	5	6	6	6.5	72.1	164	176	7	6.5	61.5	5	12	5	7.5 13	2
8 FT	12	14	11	11	5	6.5	6	7.5	68.5	32.0	36.0	6	12	61.5	6	12	36.5	6	8	6	7	70.1	166	178	7	7	61.5	5	12	5	7.5 0	)
10 FT	13	15	11	11	5	6.5	6	7	65.9	37.0	37.0	6	12	59.5	6	12	36.0	6	7.5	6	6.5	67.4	167	179	7	6.5	61.0	5	12	5	7.5 0	)
12 FT	14	16	12	11	5	6	6	7	64.0	38.0	38.0	7	15	61.5	7	15	38.5	6	7	6	7	65.5	168	180	7	6.5	60.5	5	12	5	7 0	_
14 FT	15	17	12	11	6	7.5	6	6.5	68.5	39.0	39.0	7	15	69.0	7	15	46.5	6	6.5	6	6	64.1	169	181	7	6.5	60.5	5	12	5	7 0	_
16 FT	17	19	13	11	6	7.5	6	6.5	68.0	41.0	41.0	7	15	68.0	7	15	46.5	6	6.5	6	7	63.4	171	183	7	6.5	60.5	5	12	5	6.5 0	_
18 FT	18	20	13	11	6	7	6	6	66.9	42.0	42.0	7	15	67.5	7	15	46.5	6	6	6	6	62.4	172	184	7	6.5	60.5	5	12	5	6.5 0	_
20 FT	19	22	14	11	6	6.5	6	6	66.5	43.0	43.0	7	14	67.0	7	14	46.0	6	6	6	7	62.0	174	186	7	7	60.5	5	12	5	6 0	_
22 FT	20	23	14	11	6	6	7	8	70.6	44.0	44.0	7	14	66.5	7	14	46.0	6	6	6	6	61.3	175	187	7	6.5	60.5	5	12	5	6 0	_
24 FT	22	25	15	11	6	6	6	6	66.1	46.0	46.0	7	15	65.5	7	15	45.5	6	6	6	7	61.5	177	189	7	6.5	60.5	5	12	6	8 0	_
26 FT	23	25	15	11	7	7.5	7	7.5	70.6	47.0	47.0	7	14	65.0	7	14	45.5	7	7	6	6	60.9	177	189	7	6.5	60.5	5	12	6	8 0	_
28 FT	24	27	16	11	7	7.5	7	8	71.0	48.0	48.0	7	14	64.5	7	14	45.0	7	8	6	7	61.3	179	191	7	6	60.5	5	12	6	8 0	_
30 FT	25	28	16	11	7	7	7	8	68.5	49.0	49.0	7	14	63.5	7	14	44.0	7	7.5	6	7	58.9	180	192	7	6	60.5	5	12	6	8 0	_
32 FT	26	29	16	11	7	7	7	7.5	68.4	50.0	50.0	7	13	62.5	7	13	43.5	7	7.5	6	6.5	58.9	181	193	8	7.5	66.5	5	12	6	8 0	_
34 FT	27	30	17	11	7	6.5	7	7.5	69.0	51.0	51.0	7	13	61.5	7	13	42.5	7	7.5	6	7	59.1	182	194	8	7.5	66.5	5	12	6	7.5 0	_
36 FT	27	31	17	11	7	6	7	6.5	68.9	51.0	51.0	7	12	61.5	7	12	43.5	7	7	6	7	59.1	183	195	8	7	66.5	5	12	6	7.5 0	_
38 FT	28	33	18	11	7	6	7	7	69.8	52.0	52.0	7	12	60.0	7	12	42.5	7	7	6	6.5	59.6	185	197	8	6.5	66.5	5	12	6	7 0	_
40 FT	29	34	19	11	7	6	7	7	70.4	53.0	53.0	7	12	59.5	7	12	41.5	7	7	6	6.5	60.0	186	198	8	6.5	66.5	5	12	6	6.5 0	-
42 FT	30	35	19	11	7	6	7	6.5	70.4	54.0	54.0	7	12	59.0	7	12	40.5	7	7	6	6.5	60.1	187	199	8	6.5	66.5	5	12	6	6.5 0	-
44 FT	31	36	20	11	7	6	7	7	71.0	55.0	55.0	8	15	66.5	8	15	47.5	7	7	6	6	60.5	188	200	8	6	66.5	5	12	6	6.5 0	_
46 FT	32	37	21	11	8	7.5	7	7	71.8	56.0	56.0	8	15	66.0	8	15	47.0	7	6.5	6	6	60.8	189	201	8	6	66.5	5	12	6	6 0	_
48 FT	32	38	21	11	8	7	7	6	71.8	56.0	56.0	8	14	66.0	8	14	47.0	7	6.5	6	6	60.9	190	202	8	6	66.5	5	12	6	6 0	_
50 FT	33	39	22	11	8	7	7	6.5	72.5	57.0	57.0	8	15	65.5	8	15	47.0	7	6.5	6	6	61.3	191	203	8	6	66.5	5	12	6	6 0	<u>)</u>

										SPAN	(S)	= 1	3 FT			HE	IGHT	(HT	) = 1	15 F	T OR	16 F	T									
		MEME								TOP	SL AB	BARS									В	MOTTO	SLAB E	BARS					₩AL	_L BA	RS	
DESIGN	1	THICK	NESS		A1	BARS			J3 BA	RS			H1 BA	.RS		H2 BA	\RS	A2	BARS			J4 BA	₹S			нз ва	.RS	В1	BARS	B?	2 BARS	š į
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	K HT=15'		SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	K HT=15'	3 HT=16′	S I ZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	12	12	13	5	6	5	6	65.0	34.0	34.0	5	12	128.5	5	12	36.0	5	6.5	6	7	99.8	188	200	6	6.5	61.0	5	12	5	7	12
2 FT	15	13	12	13	6	8	6	8.5	72.0	35.0	39.0	6	16	135.5	6	16	43.5	5	6.5	6	7	96.4	189	201	6	6.5	60.5	5	12	5	7	12
4 FT	11	13	12	13	5	6	6	7	115.0	35.0	35.0	6	14	81.0	6	14	38.5	5	6	6	6.5	91.6	189	201	6	6	60.5	5	12	5	7	12
6 FT	11	13	12	13	5	6.5	6	6.5	84.8	35.0	35.0	6	13	63.5	6	13	37.5	5	6	6	6	84.8	189	201	7	7	62.0	5	12	5	6.5	12
8 FT	12	14	13	13	5	6.5	6	7	78.8	36.0	36.0	6	13	61.0	6	13	37.0	6	8	6	6.5	80.6	190	202	7	7	61.5	5	12	5	6.5	0
10 FT	13	15	13	13	5	6.5	6	7	75.9	37.0	37.0	6	12	59.5	6	12	36.5	6	7.5	6	6.5	78.4	191	203	7	6.5	61.0	5	12	5	6.5	0
12 FT	14	16	14	13	5	6	6	7	72.9	38.0	38.0	6	12	58.5	6	12	36.5	6	6.5	6	6.5	75.6	192	204	7	6.5	61.0	5	12	5	6	0
14 FT	15	18	14	13	6	8	6	6	77.1	39.0	39.0	7	16	69.0	7	16	47.0	6	6.5	6	6	75.3	194	206	7	7	61.0	5	12	5	6	0
16 FT	16	19	15	13	6	7.5	6	6	76.0	40.0	40.0	7	15	68.0	7	15	47.0	6	6.5	6	6	73.3	195	207	7	6.5	61.0	5	12	6	8	0
18 FT	18	20	16	13	6	7	6	6	76.0	42.0	42.0	7	15	67.5	7	15	47.0	6	6	6	6	71.6	196	208	7	6.5	61.0	5	12	6	8	0
20 FT	19	22	16	13	6	6.5	7	8	80.4	43.0	49.0	7	15	67.5	7	15	47.0	6	6	7	7.5	74.5	198	210	7	7	61.0	5	12	6	8	0
22 FT	20	23	17	13	6	6.5	7	8	79.9	44.0	50.0	7	14	67.0	7	14	46.5	6	6	7	7.5	73.9	199	211	7	6.5	61.0	5	12	6	7.5	0
24 FT	21	24	17	13	6	6	7	7.5	79.6	45.0	51.0	7	14	66.5	7	14	46.5	7	7	7	7	73.6	200	212	7	6.5	61.0	5	12	6	7.5	0
26 FT	23	26	18	13	7	7.5	7	7.5	80.1	47.0	53.0	7	15	65.5	7	15	46.0	7	8	7	8	73.9	202	214	7	6.5	61.0	5	12	6	7	0
28 FT	23	27	19	13	7	7.5	7	7.5	80.0	47.0	47.0	7	14	65.0	7	14	46.0	7	7.5	6	6	70.9	203	215	7	6	61.0	5	12	6	6.5	0
30 FT	24	28	19	13	7	7.5	7	7.5	77.8	48.0	48.0	7	14	64.5	7	14	46.0	7	7.5	6	6	68.5	204	216	7	6	61.0	5	12	6	6.5	0
32 FT	25	29	19	13	7	7	7	7	77.8	49.0	49.0	7	14	63.5	7	14	45.5	7	7.5	6	6	68.6	205	217	8	7.5	67.0	5	12	6	6.5	0
34 FT	26	-	20	13	7	7	7	7	78.3	50.0	50.0	7	13	63.0	7	13	44.5	7	6.5	6	6	68.9	206	218	8	7.5	67.0	5	12	6	6.5	0
36 FT	27	32	21	13	7	6.5	7	7	78.9	51.0	51.0	7	13	62.0	7	13	43.5	7	7	6	6	69.4	208	220	8	7	67.0	5	12	6	6	0
38 FT	28	_	22	13	7	6.5	7	7	79.4	52.0	58.0	7	12	61.0	7	12	43.0	7	7	7	7.5	72.6	209	221	8	6.5	67.0	5	12	6	6	0
40 FT	29	_	22	13	7	6.5	7	6.5	79.5	59.0	59.0	7	12	60.0	7	12	42.0	7	7	7	7.5	72.9	210	222	8	6.5	67.0	5	12	6	6	0
42 FT	30	_	23	13	7	6	7	6.5	80.1	60.0	60.0	7	12	60.0	7	12	41.0	7	7	7	7.5	73.1	211	223	8	6.5	67.0	5	12	<del>  7</del>	7.5	0
44 FT	31	$\overline{}$	24	13	7	6	7	6.5	80.8	55.0	61.0	8	15	67.5	8	15	48.5	7	6.5	7	7	73.5	212	224	8	6	67.0	5	12	<del>  7</del>	7.5	0
46 FT	32		24	13	7	6	7	6	80.8	56.0	62.0	8	15	67.0	8	15	48.0	7	6.5	7	7	73.6	213	225	8	6	67.0	5	12	<del>  7</del>	7.5	0
48 FT	32	$\overline{}$	26	13	8	7.5	7	6	81.9	56.0	62.0	8	14	67.0	8	14	48.0	7	6.5	7	7.5	74.1	214	226	8	6	67.0	5	12	<del>  7</del>	7.5	0
50 FT	33	39	27	13	8	7	7	6	82.6	57.0	63.0	8	15	66.0	8	15	47.5	7	6.5	7	7.5	74.5	215	227	8	6	67.0	5	12	7	8	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY• MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 13 FEET HE[GHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

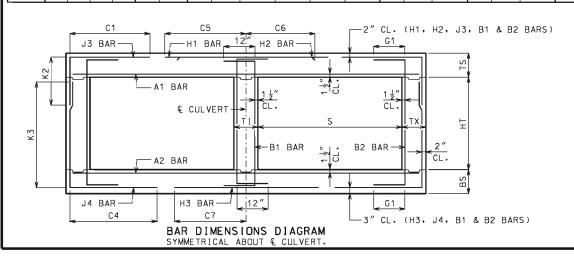
9/8/2011

703.47

SHEET NO. 21 OF 27

										SP	AN (S	) = 1	4 F	Т		HE	E I GH	Г (НТ	) =	7 FT	OR	8 F	T OR	9 FT										$\equiv$
		MEM									TOP SL	AB BARS	S										ВОТТ	OM SLA	AB BAR	S					WAL	L BAI	RS	
DESIGN		THIC	(NES:	S	Α1	BARS			J3	BARS				H1 B	RS		H2 BA	RS	A2	BARS			J4	BARS				H3 BA	RS	B1	BARS	B2	2 BARS	3
FILL	TS	вѕ	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	K2 HT=8'	HT=9'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	11	8	8	6	8	5	8	69.3	31.0	35.0	35.0	6	16	137.5	6	16	46.5	5	6.5	5	6	57.8	91	103	115	6	6	63.0	5	12	5	12	12
2 FT	15	12	8	8	6	8	5	8	69.3	35.0	35.0	35.0	6	16	137.5	6	16	48.0	5	6	5	6.5	52.5	92	104	116	6	6	62.5	5	12	5	12	12
4 FT	12	11	8	8	6	7.5	5	6	48.0	32.0	32.0	32.0	6	12	86.0	6	12	39.5	5	6.5	6	7	49.3	91	103	115	7	6	64.5	5	12	5	12	12
6 FT	12	13	8	8	6	8	6	7.5	47.6	32.0	32.0	32.0	7	15	74.0	7	15	41.0	5	6	5	7	41.9	93	105	117	7	6.5	64.5	5	12	5	12	12
8 FT	13	14	8	8	5	6	5	6.5	41.1	33.0	33.0	33.0	7	15	68.5	7	15	40.0	6	8	5	7.5	39.1	94	106	118	7	6.5	64.0	5	12	5	12	0
10 FT	14	15	8	8	6	8	5	6.5	38.6	34.0	34.0	34.0	7	14	66.5	7	14	39.5	6	7.5	5	7.5	37.4	95	107	119	7	6	63.5	5	12	5	12	0
12 FT	16	17	8	8	6	8	5	6.5	41.5	36.0	36.0	36.0	7	14	73.0	7	14	47.5	6	7	5	7	36.1	97	109	121	7	6.5	63.5	5	12	5	11	0
14 FT	17	18	8	8	6	7.5	5	6	40.3	37.0	37.0	37.0	7	14	72.5	7	14	47.0	6	6.5	5	6.5	35.1	98	110	122	7	6.5	63.0	5	12	5	10	0
16 FT	18	20	8	8	6	7	6	8	43.4	38.0	38.0	38.0	7	13	71.5	7	13	47.0	6	6	5	6	34.4	100	112	124	7	6.5	63.0	5	12	5	9.5	0
18 FT	20	21	8	8	6	6.5	6	7.5	42.4	44.0	44.0	44.0	7	13	71.0	7	13	46.5	6	6	6	7.5	37.0	101	113	125	7	6.5	63.0	5	12	5	9.5	0
20 FT	21	22	8	8	6	6	6	7	41.8	45.0	45.0	45.0	7	13	70.5	7	13	46.5	7	7.5	6	7	36.5	102	114	126	7	6	63.0	5	12	5	9	0
22 FT	23	24	8	8	7	7.5	6	6	41.3	47.0	47.0	47.0	7	13	69.5	7	13	46.5	7	7.5	6	6	36.4	104	116	128	7	6	63.0	5	12	5	8	0
24 FT	24	26	9	8	7	7.5	6	7	42.1	48.0	48.0	48.0	7	13	69.0	7	13	46.0	7	7.5	6	6.5	36.8	106	118	130	7	6.5	63.0	5	12	5	8.5	0
26 FT	25	27	9	8	7	7	6	6.5	41.9	49.0	49.0	49.0	7	12	68.5	7	12	46.0	7	7.5	6	6.5	36.6	107	119	131	7	6	63.0	5	12	5	8	0
28 FT	26	28	9	8	7	7	6	6	41.8	50.0	50.0	50.0	7	12	68.0	7	12	46.0	7	7.5	6	6	36.6	108	120	132	7	6	63.0	5	12	5	7.5	0
30 FT	27	29	9	8	7	6.5	6	6	41.1	51.0	51.0	51.0	7	12	67.0	7	12	45.5	7	7	6	6	35.4	109	121	133	8	7.5	68.5	5	12	5	7.5	0
32 FT	28	31	10	8	7	6.5	6	6.5	41.8	52.0	52.0	52.0	7	12	66.0	7	12	45.0	7	7	6	6	35.9	111	123	135	8	7	68.5	5	12	5	8	0
34 FT	29	32	10	8	7	6	6	6.5	41.8	53.0	53.0	53.0	7	12	65.5	7	12	44.5	7	7	6	6	36.0	112	124	136	8	7	68.5	5	12	5	7.5	0
36 FT	31	33	10	8	7	6	6	6	41.8	55.0	55.0	55.0	8	15	71.5	8	15	50.5	7	7	7	6.5	39.4	113	125	137	8	6.5	68.5	5	12	5	6.5	0
38 FT	31	34	11	8	8	7	6	6.5	42.3	55.0	55.0	55.0	8	14	71.5	8	14	51.0	7	6.5	6	6	36.8	114	126	138	8	6.5	68.5	5	12	5	7.5	0
40 FT	33	35	11	8	8	7.5	6	6	42.3	57.0	57.0	57.0	8	14	69.5	8	14	49.0	7	6	6	6	37.0	115	127	139	8	6.5	68.5	5	12	5	7	0
42 FT	33	37	11	8	8	7	6	6	42.3	57.0	57.0	57.0	8	14	69.5	8	14	49.5	7	6.5	7	6.5	40.1	117	129	141	8	6	68.5	5	12	5	6.5	0
44 FT	34	38	12	8	8	7	6	6.5	43.3	58.0	58.0	58.0	8	14	69.0	8	14	48.5	7	6.5	6	6	37.6	118	130	142	8	6	68.5	5	12	5	7	0
46 FT	35	39	12	8	8	6.5	6	6.5	43.1	59.0	59.0	59.0	8	13	68.5	8	13	47.5	7	6.5	6	6	37.9	119	131	143	8	6	68.5	5	12	5	6.5	0
48 FT	36	40	12	8	8	6.5	6	6.5	43.1	60.0	60.0	60.0	8	13	67.5	8	13	46.5	7	6.5	6	6	38.1	120	132	144	9	7	74.5	5	11.5	5	6	0
50 FT	37	41	12	8	8	6.5	6	6	43.3	61.0	61.0	61.0	8	13	67.0	8	13	46.5	7	6	7	6.5	41.3	121	133	145	9	7	74.5	5	8.5	6	8	0

										SPAI	(S)	= 14	FΤ			HE:	IGHT	(HT)	= '	10 F1	OR	11	FT OF	≀ 12 F	Ŧ									
		MEM									TOP SLA	AB BARS	_											OM SLA	B BAR	S					₩AL			
DESIGN		THICK	NESS	5	A1	BARS			J3	BARS				H1 BA	RS		H2 B4	ARS	A2	BARS			J4	BARS				нз ва	RS	B1 I	BARS	В2	2 BARS	_
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=10'	K2 HT=11'	HT=12'	S I ZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=101	K3 HT=11′	HT=12′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	8	10	9	8	5	7	69.6	35.0	35.0	35.0	6	16	138.5	6	16	47.0	5	6.5	6	6	83.9	128	140	152	6	6.5	63.5	5	12	5	9.5	12
2 FT	15	13	8	10	6	8	5	6.5	69.6	35.0	35.0	35.0	6	16	138.5	6	16	48.0	5	6	6	6	77.4	129	141	153	6	6.5	63.0	5	12	5	9.5	12
4 FT	12	12	10	10	6	8	5	6	70.1	32.0	32.0	32.0	6	13	85.5	6	13	40.0	5	6	6	7	65.5	128	140	152	7	6.5	65.5	5	10	5	9.5	12
6 FT	12	13	10	10	6	8.5	5	6	58.6	32.0	32.0	32.0	6	12	69.0	6	12	38.0	5	6	6	7	60.8	129	141	153	7	6.5	64.5	5	12	5	9.5	12
8 FT	13	14	10	10	5	6	6	7	57.1	33.0	33.0	37.0	7	15	68.0	7	15	40.5	6	8	6	7	57.4	130	142	154	7	6.5	64.0	5	12	5	9	0
10 FT	14	16	10	10	5	6	6	7	54.4	34.0	34.0	34.0	7	15	66.5	7	15	40.0	6	7	5	6	52.0	132	144	156	7	6.5	64.0	5	12	5	8	0
12 FT	15	17	10	10	6	8	6	7	58.6	35.0	35.0	39.0	7	14	73.0	7	14	48.0	6	7	6	7.5	53.1	133	145	157	7	6.5	63.5	5	12	5	8	0
14 FT	17	18	10	10	6	7.5	6	7	57.1	37.0	37.0	41.0	7	14	72.5	7	14	47.5	6	6.5	6	6.5	52.0	134	146	158	7	6.5	63.5	5	12	5	8	0
16 FT	18	20	11	10	6	7	6	7	57.0	38.0	38.0	42.0	7	14	71.5	7	14	47.5	6	6	6	8	51.5	136	148	160	7	6.5	63.5	5	12	5	7.5	0
18 FT	19	21	12	10	6	6.5	6	7	56.9	39.0	39.0	43.0	7	13	71.0	7	13	47.5	6	6	6	8.5	51.1	137	149	161	7	6.5	63.5	5	12	5	7	0
20 FT	21	23	12	10	6	6	6	7	56.1	41.0	41.0	45.0	7	13	70.5	7	13	47.0	7	8	6	8	50.8	139	151	163	7	6.5	63.5	5	12	5	7	0
22 FT	22	24	12	10	6	6	6	6.5	55.5	42.0	42.0	46.0	7	13	70.0	7	13	47.0	7	7.5	6	7.5	50.1	140	152	164	7	6.5	63.5	5	12	5	7	0
24 FT	23	26	13	10	7	7	6	6.5	55.9	43.0	43.0	47.0	7	12	69.5	7	12	47.0	7	7.5	6	8.5	50.3	142	154	166	7	6.5	63.5	5	12	5	6.5	0
26 FT	25	27	13	10	7	7	6	6.5	55.5	45.0	45.0	49.0	7	13	68.5	7	13	46.5	7	7.5	6	8	50.3	143	155	167	7	6	63.5	5	12	5	6.5	0
28 FT	26	29	14	10	7	7	6	6.5	56.3	46.0	50.0	50.0	7	13	67.5	7	13	46.5	7	7.5	6	8.5	50.5	145	157	169	8	7.5	69.5	5	12	5	6	0
30 FT	27	30	14	10	7	6.5	6	6.5	56.0	47.0	51.0	51.0	7	13	67.0	7	13	46.0	7	7	6	8	50.5	146	158	170	8	7.5	69.5	5	12	5	6	0
32 FT	28	31	14	10	7	6.5	6	6.5	54.3	52.0	52.0	52.0	7	12	66.0	7	12	45.5	7	7	6	7.5	48.9	147	159	171	8	7	69.5	5	12	5	6	0
34 FT	29	32	14	10	7	6	6	6	54.1	53.0	53.0	53.0	7	12	65.0	7	12	44.5	7	7	6	7.5	48.9	148	160	172	8	7	69.0	5	12	5	6	0
36 FT	30	33	15	10	7	6	6	6.5	54.9	54.0	54.0	54.0	7	12	64.0	7	12	44.0	7	6	6	7	49.4	149	161	173	8	6.5	69.5	5	12	6	8	0
38 FT	31	35	15	10	8	7.5	6	6	55.0	55.0	55.0	55.0	8	15	71.0	8	15	51.0	7	6.5	6	6.5	49.6	151	163	175	8	6.5	69.0	5	12	6	8	0
40 FT	32	36	16	10	8	7.5	6	6	55.8	56.0	56.0	56.0	8	14	70.0	8	14	50.0	7	6.5	6	6.5	50.0	152	164	176	8	6	69.5	5	12	6	8	0
42 FT	33	37	16	10	8	7	6	6	55.8	57.0	57.0	57.0	8	14	69.5	8	14	49.5	7	6.5	6	6.5	50.1	153	165	177	8	6	69.0	5	12	6	8	0
44 FT	34	38	16	10	8	7	6	6	55.6	58.0	58.0	58.0	8	14	69.0	8	14	48.5	7	6.5	6	6	50.3	154	166	178	8	6	69.0	5	12	6	8	0
46 FT	35	39	17	10	8	7	6	6	56.5	59.0	59.0	59.0	8	13	68.5	8	13	47.5	7	6	6	6	50.8	155	167	179	8	6	69.0	5	12	6	7.5	0
48 FT	35	40	17	10	8	6	7	7.5	61.5	59.0	59.0	59.0	8	12	68.5	8	12	48.0	7	6	6	6	50.8	156	168	180	9	7	75.0	5	12	6	7.5	0
50 FT	36	41	17	10	8	6.5	7	7	61.5	60.0	60.0	66.0	8	13	68.0	8	13	47.5	7	6	7	8	53.9	157	169	181	9	7	75.0	5	12	6	7.5	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 14 FEET HE[GHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: DATE PREPARED:

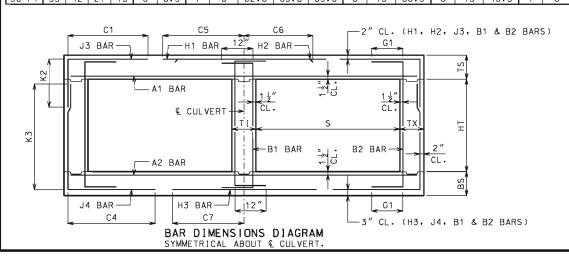
: 10/01/2011 : 9/8/2011

703.47

SHEET NO. 22 OF 27

											SPAN (S	) = 1	4 FT			HE	IGHT	(HT	) = 1	13 F	T OR	14 F	Ţ									
Fill   TS   BS   TX   TI   SIZE   SPA   SIZE   SPA   C1											TOP SLAE	BARS									В	BOTTOM	SLAB E	BARS					₩AL			
S   S   IX   IX   SIZE   SPA   SIZE	DESIGN		THIC	(NES	S	A1	BARS			J3 BA	RS		H1 B4	ARS		H2 B4	RS	A2	BARS			J4 BA	RS			НЗ ВА	RS	В1	BARS	Ba	2 BARS	ŝ
Section   Process   Process   Section   Process   Proc	FILL	TS	BS	TX	ΤI	S I ZE	SPA.	SIZE	SPA.	C1		<u>4′</u> SIZ	E SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4			SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
A FT   12   12   10   11   6   7.5   6   7.5   100.0   36.0   36.0   6   13   94.5   6   13   40.0   5   6   6   6   77.9   164   176   7   6.5   65.5   5   12   5   8	1 FT	15	12	9	11	6	8	5	6	70.4	35.0 35.	) 6	16	139.0	6	16	47.0	5	6	6	6	96.1	164	176	6	6	64.0	5	12	5	8.5	12
6 FT 12 13 10 11 6 8 6 6 7 74.8 36.0 36.0 6 12 69.0 6 12 38.5 5 6 6 6 6 72.4 165 177 7 6.5 65.0 5 12 5 8 8 1 10 FT 13 14 11 11 5 6 6 6 7 66.4 37.0 37.0 7 16 68.0 7 16 41.0 6 8 6 7 66.4 166 178 7 6 64.0 5 12 5 7.5 12 FT 13 14 16 11 1 1 5 6 6 6 6.5 65.4 38.0 38.0 7 15 66.5 7 15 40.5 6 7 6 6.5 66.8 168 180 7 6.5 64.0 5 12 5 7.5 12 FT 15 17 12 11 6 8 6 6 6.5 65.4 39.0 39.0 7 14 73.0 7 14 48.0 6 7 6 6 7 66.5 66.8 168 180 7 6 6.5 64.0 5 12 5 7.5 12 FT 15 17 18 12 11 6 8 6 6 6.5 66.5 66.8 40.0 39.0 7 14 71.5 7 14 48.0 6 7 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	2 FT	15	13	10	11	6	8	5	6	71.0	35.0 35.	) 6	16	139.5	6	16	47.5	5	6	6	6.5	87.6	165	177	6	6.5	63.5	5	12	5	8	12
8 FT 13 14 11 11 5 6 6 6 7 68.4 37.0 37.0 7 16 68.0 7 16 41.0 6 8 6 7 68.4 166 178 7 6 64.0 5 12 5 7.5 10 FT 14 16 11 11 5 6 6 6 6.5 65.4 38.0 38.0 7 15 66.5 7 15 40.5 6 7 6 6.5 66.8 168 180 7 6.5 64.0 5 12 5 7.5 12 FT 15 17 12 11 6 8 6 6 6.5 69.4 39.0 39.0 39.0 7 14 73.0 7 14 48.0 6 7 6 7 6 7 64.6 169 181 7 6.5 64.0 5 12 5 7.5 14 FT 17 18 12 11 6 7.5 6 6 6.5 69.4 39.0 39.0 7 14 71.0 7 15 72.0 7 15 48.0 6 7 6 7 6 7 64.6 169 181 7 6.5 64.0 5 12 5 7.5 14 FT 17 18 12 11 6 7 6 6 6.5 69.4 41.0 41.0 7 15 72.0 7 15 48.0 6 7 6 7 6 7 64.6 169 181 7 6.5 66.5 61.0 5 12 5 7 7 14 FT 17 18 12 11 6 7 6 6 6.5 69.4 42.0 42.0 7 14 71.5 7 14 47.5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	4 FT	12	12	10	11	6	7.5	6	7.5	100.0	36.0 36.	) 6	13	94.5	6	13	40.0	5	6	6	6	77.9	164	176	7	6.5	65.5	5	12	5	8	12
10 FT 14 16 11 11 5 6 6 6.5 65.4 38.0 38.0 7 15 66.5 7 15 40.5 6 7 6 6.5 66.8 168 180 7 6.5 64.0 5 12 5 7.5 12 FT 15 17 12 11 6 8 6 6.5 69.4 39.0 39.0 7 14 73.0 7 14 48.0 6 7 6 7 64.6 169 181 7 6.5 64.0 5 12 5 7 14 FT 17 18 12 11 6 7.5 6 6.5 67.9 41.0 41.0 7 15 72.0 7 14 48.0 6 6 6 6 6 63.0 170 182 7 6 63.5 5 12 5 7 16 FT 18 20 13 11 6 7 6 6.5 66.9 42.0 42.0 7 14 71.5 7 14 47.5 6 6 6 6 6 63.0 170 182 7 6 63.5 5 12 5 7 18 FT 19 21 3 11 6 6 6 6 6 6 6 65.6 43.0 43.0 43.0 7 13 71.0 7 13 47.5 7 8 6 6 6 6 6 61.0 173 185 7 6.5 63.5 5 12 5 6.5 18 FT 19 21 3 11 6 6 6 6 6 6 6 6 65.4 45.0 45.0 7 14 70.0 7 14 47.5 7 8 6 6 6 6 6 61.0 173 185 7 6.5 63.5 5 12 5 6.5 12 FT 21 23 14 11 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	6 FT	12	13	10	11	6	8	6	7	74.8	36.0 36.	) 6	12	69.0	6	12	38.5	5	6	6	6	72.4	165	177	7	6.5	65.0	5	12	5	8	12
12 FT 15 17 12 11 6 8 6 6 6.5 69.4 39.0 39.0 7 14 73.0 7 14 48.0 6 7 6 7 64.6 169 181 7 6.5 64.0 5 12 5 7 14 FT 17 18 12 11 6 7.5 6 6.5 67.9 41.0 41.0 7 15 72.0 7 15 48.0 6 6 6 6 6 6 63.0 170 182 7 6 63.5 5 12 5 7 18 FT 19 21 13 11 6 6.5 6 6.5 66.9 42.0 42.0 7 14 71.5 7 14 47.5 6 6 6 6 7 62.1 172 184 7 6.5 63.5 5 12 5 6.5 18 FT 19 21 13 11 6 6.5 6 6 6 6 65.6 43.0 43.0 43.0 7 13 71.0 7 13 47.5 7 8 6 6 6 6 1.0 173 185 7 6.5 63.5 5 12 5 6.5 12	8 FT	13	14	11	11	5	6	6	7	68.4	37.0 37.	7	16	68.0	7	16	41.0	6	8	6	7	68.4	166	178	7	6	64.0	5	12	5	7.5	0
14 FT   17   18   12   11   6   7.5   6   6.5   67.9   41.0   41.0   7   15   72.0   7   15   48.0   6   6   6   6   6   6   6   6   6	10 FT	14	16	11	11	5	6	6	6.5	65.4	38.0 38.	7	15	66.5	7	15	40.5	6	7	6	6.5	66.8	168	180	7	6.5	64.0	5	12	5	7.5	0
16 FT 18 20 13 11 6 7 6 6.5 66.9 42.0 42.0 7 14 71.5 7 14 47.5 6 6 6 6 7 62.1 172 184 7 6.5 63.5 5 12 5 6.5 18 FT 19 21 13 11 6 6.5 6 6 6 65.6 43.0 43.0 7 13 71.0 7 13 47.5 7 8 6 6 6 61.0 173 185 7 6.5 63.5 5 12 5 6.5 20 FT 21 23 14 11 6 6 6 6 6 6 65.4 45.0 45.0 7 14 70.0 7 14 47.5 7 8 6 6 7 60.6 175 187 7 6.5 63.5 5 12 5 6.5 22 FT 22 24 14 11 6 6 6 7 8 69.4 46.0 46.0 7 13 69.5 7 13 47.0 7 7 6 6 6 59.8 176 188 7 6.5 63.5 5 12 5 6 6 24 FT 23 26 15 11 7 7 7.5 7 8 69.0 48.0 48.0 7 13 69.5 7 13 47.0 7 7 7 6 6 6 59.8 176 188 7 6.5 63.5 5 12 6 8 8 1 8 11 7 7 7 7 7 7 7 7 7 8 8 8 9 9 9 9 9 9 9 9	12 FT	15	17	12	11	6	8	6	6.5	69.4	39.0 39.	7	14	73.0	7	14	48.0	6	7	6	7	64.6	169	181	7	6.5	64.0	5	12	5	7	0
18 FT   19   21   13   11   6   6.5   6   6   65.6   43.0   43.0   7   13   71.0   7   13   47.5   7   8   6   6   61.0   173   185   7   6.5   63.5   5   12   5   6.5	14 FT	17	18	12	11	6	7.5	6	6.5	67.9	41.0 41.	7 (	15	72.0	7	15	48.0	6	6	6	6	63.0	170	182	7	6	63.5	5	12	5	7	0
20 FT 21 23 14 11 6 6 6 6 6 6 65.4 45.0 45.0 7 14 70.0 7 14 47.5 7 8 6 7 60.6 175 187 7 6.5 63.5 5 12 5 6 24 FT 22 24 14 11 6 6 6 7 8 69.4 46.0 46.0 7 13 69.5 7 13 47.0 7 7 6 6 6 59.8 176 188 7 6.5 63.5 5 12 5 6 24 FT 23 26 15 11 7 7.5 7 8 69.5 47.0 47.0 7 13 69.0 7 13 47.0 7 7 7 6 6 6 59.8 176 188 7 6.5 63.5 5 12 6 8 26 FT 24 27 15 11 7 7 7 7.5 69.5 49.0 48.0 48.0 7 13 68.5 7 13 47.0 7 7 6 6 6.5 59.3 179 191 7 6 63.5 5 12 6 8 8 30 FT 27 30 16 11 7 6.5 7 7.5 69.5 49.0 49.0 7 13 66.0 7 13 46.5 7 7 6 6 7 59.5 181 193 8 7.5 69.5 5 12 6 8 8 30 FT 27 30 16 11 7 6.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 6 7 57.1 183 195 8 7 69.5 5 12 6 8 8 34 FT 29 32 17 11 7 6 7 7 7.5 67.8 53.0 53.0 7 12 64.0 7 12 44.5 7 7 6 6 7 57.5 184 196 8 7 69.5 5 12 6 8 8 34 FT 29 32 17 11 7 6 7 7 6.5 67.8 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 8 8 34 FT 33 38 18 11 7 6 7 7 6 6.5 67.8 53.0 53.0 7 12 63.0 7 12 44.0 7 6.5 6 6.5 59.5 184 198 8 6.5 69.5 5 12 6 7 59.5 184 194 8 7 6.5 69.5 5 12 6 8 8 14 69.0 8 14 49.0 7 6 6 7 57.5 184 196 8 7 69.5 5 12 6 7 7 6 7 7 6 7 7 7 6 7 7 7 7 7 7 7 7	16 FT	18	20	13	11	6	7	6	6.5	66.9	42.0 42.	7	14	71.5	7	14	47.5	6	6	6	7	62.1	172	184	7	6.5	63.5	5	12	5	6.5	0
22 FT 22 24 14 11 6 6 6 7 8 69.4 46.0 46.0 7 13 69.5 7 13 47.0 7 7 6 6 6 59.8 176 188 7 6.5 63.5 5 12 5 6 24 FT 23 26 15 11 7 7.5 7 8 69.5 47.0 47.0 7 13 69.0 7 13 47.0 7 7.5 6 7 59.5 178 190 7 6.5 63.5 5 12 6 8 26 FT 24 27 15 11 7 7 7 7 7.5 69.0 48.0 48.0 7 13 68.5 7 13 47.0 7 7 7 6 6 6.5 59.3 179 191 7 6 63.5 5 12 6 8 8 30 FT 27 30 16 11 7 6.5 7 7.5 69.5 49.0 49.0 7 13 66.0 7 13 46.5 7 7 6 7 6 7 59.5 181 193 8 7.5 69.5 5 12 6 8 8 32 FT 28 31 16 11 7 6.5 7 7 6 6.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 7 57.1 183 195 8 7 69.5 5 12 6 8 8 34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 7 12 64.0 7 12 44.5 7 7 6 7 57.5 184 196 8 7 69.5 5 12 6 8 8 34 FT 31 35 18 11 7 6 7 7 6 6.5 67.8 54.0 54.0 7 12 63.0 7 12 44.0 7 6.5 6.5 58.1 188 200 8 6 69.5 5 12 6 7 44 FT 33 38 20 11 8 7 7 7 6 6 9.9 57.0 57.0 8 14 69.0 8 14 69.0 8 14 48.5 7 6.5 6 6.5 58.9 190 202 8 6 69.5 5 12 6 6.5 48 FT 33 43 20 11 8 7 7 7 6 6 9.9 57.0 57.0 8 14 69.0 8 14 48.5 7 6 6 6 6 58.9 191 203 8 6 6 69.5 5 12 6 6.5 48 FT 34 48 FT 35 41 21 11 8 6.5 7 6 6.5 70.6 65.0 65.0 8 13 68.0 8 13 68.5 8 14 48.5 7 6 6 6 6 58.9 190 202 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 6 6 6 58.9 191 203 8 6 69.5 5 12 6 6.5 46.5 46.5 46.5 47 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	18 FT	19	21	13	11	6	6.5	6	6	65.6	43.0 43.	7	13	71.0	7	13	47.5	7	8	6	6	61.0	173	185	7	6.5	63.5	5	12	5	6.5	0
24 FT 23 26 15 11 7 7.5 7 8 69.5 47.0 47.0 7 13 69.0 7 13 47.0 7 7.5 6 7 59.5 178 190 7 6.5 63.5 5 12 6 8 26 FT 24 27 15 11 7 7 7 7 7.5 69.0 48.0 48.0 7 13 68.5 7 13 47.0 7 7 6 6.5 59.3 179 191 7 6 63.5 5 12 6 8 28 FT 25 29 16 11 7 6.5 7 7.5 69.5 49.0 49.0 7 13 66.5 7 13 46.5 7 7 6 7 6 7 59.5 181 193 8 7.5 69.5 5 12 6 8 8 30 FT 27 30 16 11 7 6.5 7 7 6 69.5 49.0 49.0 7 13 66.0 7 13 45.5 7 7 6 6 6.5 59.5 182 194 8 7.5 69.5 5 12 6 8 8 30 FT 27 30 16 11 7 6.5 7 7.5 69.3 51.0 51.0 51.0 7 13 66.0 7 13 45.5 7 7 6 6.5 59.5 182 194 8 7.5 69.5 5 12 6 8 8 32 FT 28 31 16 11 7 6.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 6 7 57.5 184 196 8 7 69.5 5 12 6 8 8 34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 7.5 36 FT 30 34 17 11 7 6 7 6.5 67.8 53.0 53.0 7 12 63.0 7 12 44.0 7 6.5 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 6 6.5 68.4 56.0 56.0 8 14 69.5 8 14 49.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7 4 FT 32 36 18 11 8 7 7 7 6 69.1 57.0 57.0 8 14 69.0 8 14 49.5 7 6.5 6 6.5 58.5 189 201 8 6 69.5 5 12 6 6.5 48 FT 33 38 20 11 8 7 7 7 6 69.8 57.0 57.0 8 14 69.0 8 14 48.5 7 6.5 6 6 5 58.5 189 201 8 6 69.5 5 12 6 6.5 48 FT 33 38 20 11 8 7 7 7 6 69.8 57.0 57.0 8 14 69.0 8 14 48.5 7 6 6 6 6 58.9 190 202 8 6 69.5 5 12 6 6.5 48 FT 34 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	20 FT	21	23	14	11	6	6	6	6	65.4	45.0 45.	7 0	14	70.0	7	14	47.5	7	8	6	7	60.6	175	187	7	6.5	63.5	5	12	5	6	0
26 FT 24 27 15 11 7 7 7 7.5 69.0 48.0 48.0 7 13 68.5 7 13 47.0 7 7 6 6.5 59.3 179 191 7 6 63.5 5 12 6 8 28 FT 25 29 16 11 7 6.5 7 7.5 69.5 49.0 49.0 7 13 67.5 7 13 46.5 7 7 6 7 59.5 181 193 8 7.5 69.5 5 12 6 8 30 FT 27 30 16 11 7 6.5 7 7 66.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 6.5 59.5 182 194 8 7.5 69.5 5 12 6 8 32 FT 28 31 16 11 7 6.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 6 7 57.1 183 195 8 7 69.5 5 12 6 8 34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 7.5 36 FT 30 34 17 11 7 6 7 6 6.5 67.8 54.0 54.0 54.0 7 12 63.0 7 12 43.0 7 7 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 68.5 55.0 55.0 8 15 70.0 8 15 50.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7.4 40 FT 32 36 18 11 8 7.5 7 6.5 68.4 56.0 56.0 8 14 69.0 8 14 49.5 7 6.5 6 6.5 58.1 188 200 8 6 69.5 5 12 6 6.5 44 FT 33 38 20 11 8 7 7 7 6 9.9 57.0 57.0 8 14 69.0 8 14 48.5 7 6.5 6 6.5 58.5 189 201 8 6 69.5 5 12 6 6.5 46 FT 34 39 20 11 8 7 7 6 69.8 58.0 58.0 8 14 68.5 8 14 48.5 7 6 6 6 6 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	22 FT	22	24	14	11	6	6	7	8	69.4	46.0 46.	7	13	69.5	7	13	47.0	7	7	6	9	59.8	176	188	7	6.5	63.5	5	12	5	6	0
28 FT 25 29 16 11 7 6.5 7 7.5 69.5 49.0 49.0 7 13 67.5 7 13 46.5 7 7 6 6 7 59.5 181 193 8 7.5 69.5 5 12 6 8 30 FT 27 30 16 11 7 6.5 7 7 66.5 7 7 66.5 51.0 51.0 7 13 66.0 7 13 45.5 7 7 6 6.5 59.5 182 194 8 7.5 69.5 5 12 6 8 32 FT 28 31 16 11 7 6.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 7 57.1 183 195 8 7 69.5 5 12 6 8 34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 7.5 36 FT 30 34 17 11 7 6 7 6.5 67.8 54.0 54.0 7 12 63.0 7 12 43.0 7 7 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 68.5 55.0 55.0 8 15 70.0 8 15 50.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7 42 FT 33 37 19 11 8 7 7 7 6 6.5 68.4 56.0 57.0 57.0 8 14 69.5 8 14 49.5 7 6.5 6 6.5 58.5 188 201 8 6 69.5 5 12 6 6.5 46 FT 34 39 20 11 8 7 7 6 69.9 57.0 57.0 8 14 69.0 8 14 48.5 7 6 6 6 6 5 58.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 6 6 6 6 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	24 FT	23	26	15	11	7	7.5	7	8	69.5	47.0 47.	7	13	69.0	7	13	47.0	7	7.5	6	7	59.5	178	190	7	6.5	63.5	5	12	6	8	0
30 FT 27 30 16 11 7 6.5 7 7 69.3 51.0 51.0 7 13 66.0 7 13 45.5 7 7 6 6.5 59.5 182 194 8 7.5 69.5 5 12 6 8 32 FT 28 31 16 11 7 6.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 7 57.1 183 195 8 7 69.5 5 12 6 8 34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 6 6.5 67.8 54.0 54.0 7 12 63.0 7 12 43.0 7 7 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 68.5 55.0 55.0 8 15 70.0 8 15 50.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7 42 FT 33 37 19 11 8 7 7 7 69.9 57.0 8 14 69.0 8 14 48.5 7 6.5 6 6.5 58.5 189 201 8 6 69.5 5 12 6 6.5 46 FT 34 39 20 11 8 7 7 7 69.9 57.0 57.0 8 14 69.0 8 14 48.5 7 6 6 6 6 5 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 6 6 6 5 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	26 FT	24	27	15	11	7	7	7	7.5	69.0	48.0 48.	7	13	68.5	7	13	47.0	7	7	6	6.5	59.3	179	191	7	6	63.5	5	12	6	8	0
32 FT 28 31 16 11 7 6.5 7 7.5 67.1 52.0 52.0 7 12 65.0 7 12 44.5 7 7 6 7 57.1 183 195 8 7 69.5 5 12 6 8 34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 7.5 36 FT 30 34 17 11 7 6 7 6.5 67.8 54.0 54.0 7 12 63.0 7 12 43.0 7 7 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 68.5 55.0 55.0 8 15 70.0 8 15 50.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7 42 FT 33 37 19 11 8 7 7 6 69.1 57.0 57.0 8 14 69.0 8 14 48.5 7 6.5 6 6.5 58.5 189 201 8 6 69.5 5 12 6 6.5 46 FT 34 39 20 11 8 7 7 6 6 69.8 58.0 58.0 8 14 68.5 8 14 49.0 7 6 6 6 6 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 66.8 58.0 65.0 65.0 8 14 68.5 8 14 48.5 7 6 6 6 6 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	28 FT	25	29	16	11	7	6.5	7	7.5	69.5	49.0 49.	7	13	67.5	7	13	46.5	7	7	6	7	59.5	181	193	8	7.5	69.5	5	12	6	8	0
34 FT 29 32 17 11 7 6 7 7.5 67.8 53.0 53.0 7 12 64.0 7 12 44.0 7 6.5 6 7 57.5 184 196 8 7 69.5 5 12 6 7.5 36 FT 30 34 17 11 7 6 7 6.5 67.8 54.0 54.0 7 12 63.0 7 12 43.0 7 7 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 68.5 55.0 55.0 8 15 70.0 8 15 70.0 8 15 50.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7 40 FT 32 36 18 11 8 7.5 7 6.5 68.4 56.0 56.0 8 14 69.5 8 14 49.5 7 6.5 6 6.5 58.1 188 200 8 6 69.5 5 12 6 7 44 FT 33 38 20 11 8 7 7 7 69.9 57.0 57.0 8 14 69.0 8 14 49.5 7 6.5 6 6.5 58.5 189 201 8 6 69.5 5 12 6 6.5 46 FT 34 39 20 11 8 7 7 6 6 69.8 58.0 58.0 8 14 68.5 8 14 48.5 7 6 6 6 5 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	30 FT	27	30	16	11	7	6.5	7	7	69.3	51.0 51.	7	13	66.0	7	13	45.5	7	7	6	6.5	59.5	182	194	8	7.5	69.5	5	12	6	8	0
36 FT 30 34 17 11 7 6 7 6.5 67.8 54.0 54.0 7 12 63.0 7 12 43.0 7 7 6 7 57.6 186 198 8 6.5 69.5 5 12 6 7.5 38 FT 31 35 18 11 7 6 7 7 68.5 55.0 55.0 8 15 70.0 8 15 50.5 7 6.5 6 6.5 58.0 187 199 8 6.5 69.5 5 12 6 7 40 FT 32 36 18 11 8 7.5 7 6.5 68.4 56.0 56.0 8 14 69.5 8 14 49.5 7 6.5 6 6.5 58.5 189 201 8 6 69.5 5 12 6 6.5 44 FT 33 38 8 20 11 8 7 7 7 69.9 57.0 57.0 8 14 69.0 8 14 49.0 7 6 6 6 58.9 190 202 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 6 6 6 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6.5	32 FT	28	31	16	11	7	6.5	7	7.5	67.1	52.0 52.	7 (	12	65.0	7	12	44.5	7	7	6	7	57.1	183	195	8	7	69.5	5	12	6	8	0
38 FT         31         35         18         11         7         6         7         7         68.5         55.0         55.0         8         15         70.0         8         15         50.5         7         6.5         6         6.5         58.0         187         199         8         6.5         69.5         5         12         6         7           40 FT         32         36         18         11         8         7.5         7         6.5         68.4         56.0         56.0         8         14         69.5         8         14         49.5         7         6.5         6         6.5         58.1         188         200         8         6         69.5         5         12         6         7           42 FT         33         37         19         11         8         7         7         69.1         57.0         57.0         8         14         69.0         8         14         48.5         7         6.5         69.5         5         12         6         6.5           44 FT         33         38         20         11         8         7         7         69.9	34 FT	29	32	17	11	7	6	7	7.5	67.8	53.0 53.	7 (	12	64.0	7	12	44.0	7	6.5	6	7	57.5	184	196	8	7	69.5	5	12	6	7.5	0
40 FT       32       36       18       11       8       7.5       7       6.5       68.4       56.0       56.0       8       14       69.5       8       14       49.5       7       6.5       6       6.5       5       12       6       7         42 FT       33       37       19       11       8       7       7       7       69.1       57.0       57.0       8       14       69.0       8       14       48.5       7       6.5       6       6.5       58.5       189       201       8       6       69.5       5       12       6       6.5         44 FT       33       38       20       11       8       7       7       7       69.9       57.0       57.0       8       14       69.0       8       14       49.0       7       6       6       6       58.9       190       202       8       6       69.5       5       12       6       6.5         46 FT       34       39       20       11       8       7       7       6       69.8       58.0       58.0       8       14       48.5       7       6       6 <td>36 FT</td> <td>30</td> <td>34</td> <td>17</td> <td>11</td> <td>7</td> <td>6</td> <td>7</td> <td>6.5</td> <td>67.8</td> <td>54.0 54.</td> <td>7 (</td> <td>12</td> <td>63.0</td> <td>7</td> <td>12</td> <td>43.0</td> <td>7</td> <td>7</td> <td>6</td> <td>7</td> <td>57.6</td> <td>186</td> <td>198</td> <td>8</td> <td>6.5</td> <td>69.5</td> <td>5</td> <td>12</td> <td>6</td> <td>7.5</td> <td>0</td>	36 FT	30	34	17	11	7	6	7	6.5	67.8	54.0 54.	7 (	12	63.0	7	12	43.0	7	7	6	7	57.6	186	198	8	6.5	69.5	5	12	6	7.5	0
42 FT       33       37       19       11       8       7       7       7       69.1       57.0       57.0       8       14       69.0       8       14       48.5       7       6.5       6.5       58.5       189       201       8       6       69.5       5       12       6       6.5         44 FT       33       38       20       11       8       7       7       7       69.9       57.0       57.0       8       14       69.0       8       14       49.0       7       6       6       6       58.9       190       202       8       6       69.5       5       12       6       6.5         46 FT       34       39       20       11       8       7       7       6       69.8       58.0       58.0       8       14       48.5       7       6       6       69.5       5       12       6       6.5         48 FT       35       41       21       11       8       6.5       7       6.5       70.6       65.0       8       13       68.0       8       13       47.5       7       6       6       6       69.5 </td <td>38 FT</td> <td>31</td> <td>35</td> <td>18</td> <td>11</td> <td>7</td> <td>6</td> <td>7</td> <td>7</td> <td>68.5</td> <td>55.0 55.</td> <td>8 (</td> <td>15</td> <td>70.0</td> <td>8</td> <td>15</td> <td>50.5</td> <td>7</td> <td>6.5</td> <td>6</td> <td>6.5</td> <td>58.0</td> <td>187</td> <td>199</td> <td>8</td> <td>6.5</td> <td>69.5</td> <td>5</td> <td>12</td> <td>6</td> <td>7</td> <td>0</td>	38 FT	31	35	18	11	7	6	7	7	68.5	55.0 55.	8 (	15	70.0	8	15	50.5	7	6.5	6	6.5	58.0	187	199	8	6.5	69.5	5	12	6	7	0
44 FT       33       38       20       11       8       7       7       7       69.9       57.0       57.0       8       14       69.0       8       14       49.0       7       6       6       6       69.5       5       12       6       6.5         46 FT       34       39       20       11       8       7       7       6       69.8       58.0       58.0       8       14       68.5       8       14       48.5       7       6       6       69.5       5       12       6       6.5         48 FT       35       41       21       11       8       6.5       7       6.5       70.6       65.0       65.0       8       13       68.0       8       13       47.5       7       6       7       8       62.5       193       205       9       7       75.5       5       12       6       6	40 FT	32	36	18	11	8	7.5	7	6.5	68.4	56.0 56.	8 (	14	69.5	8	14	49.5	7	6.5	6	6.5	58.1	188	200	8	6	69.5	5	12	6	7	0
46 FT 34 39 20 11 8 7 7 6 69.8 58.0 58.0 8 14 68.5 8 14 48.5 7 6 6 6 6 59.0 191 203 8 6 69.5 5 12 6 6.5 48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6	42 FT	33	37	19	11	8	7	7	7	69.1	57.0 57.	8 (	14	69.0	8	14	48.5	7	6.5	6	6.5	58.5	189	201	8	6	69.5	5	12	6	6.5	0
48 FT 35 41 21 11 8 6.5 7 6.5 70.6 65.0 65.0 8 13 68.0 8 13 47.5 7 6 7 8 62.5 193 205 9 7 75.5 5 12 6 6	44 FT	33	38	20	11	8	7	7	7	69.9	57.0 57.	8 (	14	69.0	8	14	49.0	7	6	6	6	58.9	190	202	8	6	69.5	5	12	6	6.5	0
	46 FT	34	39	20	11	8	7	7	6	69.8	58.0 58.	8 (	14	68.5	8	14	48.5	7	6	6	6	59.0	191	203	8	6	69.5	5	12	6	6.5	0
	48 FT	35	41	21	11	8	6.5	7	6.5	70.6	65.0 65.	8 (	13	68.0	8	13	47.5	7	6	7	8	62.5	193	205	9	7	75.5	5	12	6	6	0
50 FT 36 42 22 11 8 6.5 7 6.5 71.4 66.0 66.0 8 14 67.0 8 14 47.5 7 6 7 7.5 63.0 194 206 9 7 75.5 5 12 6 6 6	50 FT	36	42	22	11	8	6.5	7	6.5	71.4	66.0 66.	8 (	14	67.0	8	14	47.5	7	6	7	7.5	63.0	194	206	9	7	75.5	5	12	6	6	0

										SPAN	(S)	= 1	4 FT			HE	IGHT	(HT	) = '	15 F	T OR	16 F	T									
		MEM		,		·	,	,	·	TOP	SLAB	BARS	•	, and the second	,	•	, and the second		,		В	MOTTO	SLAB E	BARS		,	, and the second		₩AL	LL BA	RS	
DESIGN		THICK	(NESS	3	A1	BARS		,	J3 BA	RS	, and the second		H1 B <b>A</b>	RS		H2 BA	ARS	A2	BARS		•	J4 BA	RS	,		нз ва	RS	B1	BARS	B2	2 BARS	S
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=15'	(2  HT=16'	SIZE	SPA.	C5	SIZE	SPA.	С6	SIZI	E SPA.	SIZE	SPA.	C4	K HT=15'		S I ZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G
1 FT	15	13	12	13	6	8	5	6	72.6	35.0	35.0	6	16	141.0	6	16	46.0	5	6.5	6	7.5	102.5	189	201	6	6.5	64.5	5	12	5	7	1
2 FT	15	13	12	13	6	8	6	8	75.6	35.0	39.0	6	16	144.0	6	16	47.5	5	6	6	7	95.8	189	201	6	6	63.5	5	12	5	7	1
4 FT	12	12	12	13	6	8	6	7.5	118.3	36.0	36.0	6	13	86.5	6	13	40.0	5	6	6	6	86.6	188	200	7	6.5	65.5	5	12	5	7	1
6 FT	12	13	12	13	5	6	6	7	86.4	36.0	36.0	6	12	68.0	6	12	39.0	5	6	6	6	83.0	189	201	7	6	65.0	5	12	5	7	1
8 FT	13	15	13	13	5	6	6	7	78.9	37.0	37.0	6	12	64.5	6	12	38.0	6	7.5	6	6.5	80.3	191	203	7	6.5	64.5	5	12	5	6.5	
10 FT	14	16	13	13	5	6	6	6.5	75.0	38.0	38.0	7	15	66.0	7	15	41.0	6	7	6	6.5	77.3	192	204	7	6.5	64.5	5	12	5	6.5	
12 FT	15	17	14	13	6	8	6	6.5	78.5	39.0	39.0	7	15	73.0	7	15	48.5	6	6.5	6	6.5	74.1	193	205	7	6.5	64.0	5	12	5	6	
14 FT	16	19	14	13	6	8	6	6	77.0	40.0	40.0	7	14	72.0	7	14	48.5	6	6	6	6	73.6	195	207	7	6.5	64.0	5	12	5	6	
16 FT	18	20	15	13	6	7	6	6	76.5	42.0	42.0	7	14	71.5	7	14	48.5	6	6	6	9	72.1	196	208	7	6.5	64.0	5	12	6	8	
18 FT	19	21	15	13	6	6.5	7	7.5	80.5	43.0	49.0	7	14	71.0	7	14	48.5	7	8	7	7	74.1	197	209	7	6.5	64.0	5	12	6	8	Г
20 FT	20	23	16	13	6	6.5	7	7.5	79.9	44.0	50.0	7	13	70.5	7	13	48.0	7	7.5	7	8	73.8	199	211	7	6.5	64.0	5	12	6	8	
22 FT	22	25	17	13	6	6	7	7.5	79.8	46.0	46.0	7	14	69.5	7	14	48.0	7	7.5	6	6	70.5	201	213	7	6.5	64.0	5	12	6	7.5	
24 FT	23	26	18	13	7	7.5	7	7.5	79.5	47.0	47.0	7	13	69.0	7	13	47.5	7	7.5	6	6	69.9	202	214	7	6.5	64.0	5	12	6	7	
26 FT	24	27	18	13	7	7.5	7	7	79.1	48.0	48.0	7	13	68.5	7	13	47.5	7	6.5	6	6	69.6	203	215	7	6	64.0	5	12	6	7	
28 FT	25	29	19	13	7	7	7	7	79.5	49.0	49.0	7	13	68.0	7	13	47.5	7	7	6	6	70.0	205	217	8	7.5	70.0	5	12	6	6.5	
30 FT	26	30	20	13	7	6.5	7	7	79.8	50.0	50.0	7	13	67.0	7	13	47.0	7	6.5	6	6	69.9	206	218	8	7.5	70.0	5	12	6	6.5	
32 FT	27	31	20	13	7	6.5	7	7	77.4	51.0	51.0	7	13	66.5	7	13	47.0	7	6.5	6	6	67.5	207	219	8	7	70.0	5	12	6	6.5	(
34 FT	28	32	20	13	7	6	7	7	77.4	52.0	52.0	7	12	65.5	7	12	46.0	7	6	6	6	67.6	208	220	8	7	70.0	5	12	6	6.5	
36 FT	29	34	21	13	7	6	7	7	78.0	53.0	53.0	7	12	64.5	7	12	45.0	7	6.5	6	6	68.1	210	222	8	6.5	70.0	5	12	6	6	
38 FT	30	35	22	13	7	6	7	6.5	78.6	54.0	60.0	7	12	63.5	7	12	44.5	7	6.5	7	7.5	71.4	211	223	8	6.5	70.0	5	12	6	6	
40 FT	31	36	22	13	8	7.5	7	6	78.6	61.0	61.0	8	15	71.0	8	15	51.5	7	6.5	7	7.5	71.5	212	224	8	6	70.0	5	12	6	6	
42 FT	32	37	23	13	8	7.5	7	6.5	79.3	56.0	62.0	8	14	70.0	8	14	51.0	7	6	7	7.5	71.8	213	225	8	6	70.0	5	12	7	7.5	
44 FT	33	39	24	13	8	7	7	6.5	80.0	57.0	63.0	8	14	70.0	8	14	50.0	7	6	7	7	72.4	215	227	8	6	70.0	5	12	7	7.5	
46 FT	34	40	25	13	8	7	7	6.5	80.6	58.0	64.0	8	14	69.5	8	14	49.0	7	6	7	7.5	72.6	216	228	9	7	76.0	5	12	7	7.5	
48 FT	35	41	26	13	8	7	7	6	81.4	65.0	65.0	8	14	68.5	8	14	48.5	7	6	7	7.5	73.0	217	229	9	7	76.5	5	12	7	8	
50 FT	35	42	27	13	8	6.5	7	6	82.0	65.0	65.0	8	13	68.5	8	13	48.5	7	6	7	7.5	73.3	218	230	9	7	76.5	5	12	7	8	П



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET HE [GHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

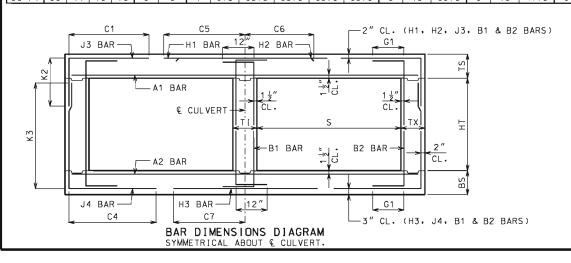
10/01/2011 9/8/2011

703.47

SHEET NO. 23 OF 27

										SP	AN (S	) = 1	5 F	Т		HE	I GH	T (HT	) =	8 F1	OR	9 F	T OR	10 F	Γ									
		MEM									TOP SL	AB BARS	5										BOTT	OM SLA	B BAR	S					WAL	L BA	.RS	
DESIGN	1	THICK	NESS	S	Α1	BARS			J3	BARS				H1 BA	RS		H2 B4	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1	BARS	В2	2 BARS	_
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	8	8	6	8	5	8	72.9	35.0	35.0	35.0	6	16	146.0	6	16	51.0	5	6	5	6	64.9	104	116	128	6	6	66.5	5	12	5	12	12
2 FT	17	13	8	8	6	7.5	5	6.5	72.9	37.0	37.0	37.0	6	14	146.0	6	14	45.5	5	6	5	6	57.8	105	117	129	6	6	65.5	5	12	5	12	12
4 FT	13	12	8	8	6	7	5	6	53.1	33.0	33.0	33.0	6	12	92.5	6	12	41.5	5	6	6	6.5	53.3	104	116	128	7	6	68.0	5	12	5	12	12
6 FT	13	13	8	8	6	7.5	6	7.5	50.4	33.0	33.0	37.0	7	15	78.5	7	15	42.5	5	6	6	7	48.9	105	117	129	7	6	67.0	5	12	5	12	12
8 FT	14	15	8	8	6	8	5	6	44.0	34.0	34.0	34.0	7	14	72.5	7	14	41.5	6	7.5	5	6.5	42.8	107	119	131	7	6	67.0	5	12	5	11	0
10 FT	15	16	8	8	6	7.5	6	8	50.5	35.0	35.0	35.0	7	13	78.0	7	13	49.0	6	7	5	6.5	40.9	108	120	132	7	6	66.5	5	12	5	10	0
12 FT	17	18	8	8	6	7.5	6	8	48.4	37.0	37.0	37.0	7	13	76.5	7	13	48.5	6	6.5	5	6	39.6	110	122	134	7	6	66.5	5	12	5	9.5	0
14 FT	18	19	8	8	6	7	6	7.5	47.0	38.0	38.0	42.0	7	13	75.5	7	13	48.5	6	6	6	8	41.5	111	123	135	7	6	66.5	5	12	5	9.5	0
16 FT	19	21	8	8	6	6	6	6.5	46.1	39.0	43.0	43.0	7	12	75.0	7	12	48.0	6	6	6	7	40.8	113	125	137	7	6	66.5	5	12	5	9	0
18 FT	21	22	9	8	6	6	6	7.5	46.0	41.0	41.0	41.0	7	12	74.0	7	12	48.0	7	7.5	5	6	37.8	114	126	138	7	6	66.0	5	12	5	8.5	0
20 FT	22	24	9	8	6	6	6	6.5	45.5	42.0	42.0	46.0	7	12	73.5	7	12	47.5	7	7.5	6	7	40.3	116	128	140	7	6	66.0	5	12	5	8.5	0
22 FT	24	26	10	8	7	7.5	6	7.5	46.0	44.0	44.0	44.0	7	12	72.5	7	12	47.5	7	7.5	5	6	37.5	118	130	142	7	6	66.0	5	12	5	8	0
24 FT	25	27	11	8	7	7	6	8	46.5	45.0	45.0	45.0	7	12	71.5	7	12	47.0	7	6.5	5	6	37.5	119	131	143	8	7	72.0	5	12	5	7.5	0
26 FT	27	29	11	8	7	6.5	6	8	46.1	47.0	47.0	51.0	7	12	70.5	7	12	47.0	7	7	6	7.5	40.6	121	133	145	8	7	72.0	5	12	5	7.5	0
28 FT	28	30	11	8	7	6.5	6	7	45.9	52.0	52.0	52.0	7	12	69.5	7	12	46.5	7	6.5	6	7	40.5	122	134	146	8	7	72.0	5	12	5	7.5	0
30 FT	29	32	12	8	7	6	6	7.5	46.9	53.0	53.0	53.0	7	12	69.0	7	12	46.5	7	7	6	7.5	41.0	124	136	148	8	7	72.0	5	12	5	7	0
32 FT	30	33	12	8	7	6	6	7.5	45.4	54.0	54.0	54.0	7	12	67.5	7	12	46.0	7	6.5	6	7	39.5	125	137	149	8	6.5	72.0	5	12	5	7	0
34 FT	31	34	12	8	8	7.5	6	7.5	45.3	55.0	55.0	55.0	8	15	75.0	8	15	53.0	7	6.5	6	7	39.6	126	138	150	8	6.5	72.0	5	12	5	7	0
36 FT	32	36	12	8	8	7	6	7	45.4	56.0	56.0	56.0	8	14	73.5	8	14	52.5	7	6.5	6	6.5	39.9	128	140	152	8	6	72.0	5	12	5	7	0
38 FT	33	37	12	8	8	6.5	6	6.5	45.4	57.0	57.0	57.0	8	13	72.5	8	13	51.5	7	6.5	6	6.5	40.0	129	141	153	8	6	72.0	5	12	5	6.5	0
40 FT	35	38	12	8	8	6.5	6	6.5	45.1	59.0	59.0	59.0	8	13	71.0	8	13	49.5	7	6	6	6	40.3	130	142	154	8	6	71.5	5	12	5	6	0
42 FT	35	39	13	8	8	6	6	6.5	46.1	59.0	59.0	59.0	8	12	71.0	8	12	50.0	7	6	6	6	40.6	131	143	155	8	6	72.0	5	12	5	6.5	0
44 FT	36	41	13	8	8	6	6	6.5	46.3	60.0	60.0	60.0	8	12	70.5	8	12	49.0	7	6	7	7	43.9	133	145	157	9	7	77.5	5	9	5	6	0
46 FT	37	42	13	8	8	6	6	6	46.3	61.0	61.0	61.0	8	12	70.0	8	12	48.0	7	6	7	7	44.1	134	146	158	9	7	77.5	5	6.5	6	8.5	0
48 FT	38	43	13	9	8	6	6	6	46.3	62.0	62.0	62.0	8	12	70.5	8	12	48.5	7	6	7	6.5	44.3	135	147	159	9	7	77.5	5	12	6	8	0
50 FT	39	44	14	9	8	6	6	6	47.1	63.0	63.0	63.0	8	12	70.0	8	12	47.5	8	7.5	7	7	44.8	136	148	160	9	6.5	77.5	5	12	6	8	0

										SPA	N (S)	= 15	FΤ			HE :	GHT	(HT)	= 1	<b>1</b> F]	OR	12	FT OR	13 F	- T									
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	AB BAR	S					₩AL	L BA	.RS	
DESIGN		THICK	(NESS	5	A1	BARS			J3	BARS				H1 BA	ıRS		H2 BA	ARS	Α2	BARS			J4	BARS				нз ва	.RS	B1 E	BARS	B2	2 BARS	
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	K2 HT=12'	HT=13'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=111	K3 HT=12'	HT=13′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	31
1 FT	15	12	9	10	6	8	5	6.5	73.9	35.0	35.0	35.0	6	16	147.0	6	16	51.0	5	6	6	6	88.3	140	152	164	6	6	67.0	5	12	5	8.5 1	12
2 FT	17	13	9	10	6	7.5	5	6.5	73.9	37.0	37.0	37.0	6	14	147.0	6	14	46.0	5	6	6	6	80.4	141	153	165	6	6	66.0	5	12	5	8.5 1	12
4 FT	13	12	9	10	6	7	6	6	85.5	33.0	37.0	37.0	6	12	96.0	6	12	42.0	5	6	6	6	70.6	140	152	164	7	6	68.5	5	12	5	8.5 1	12
6 FT	13	14	10	10	6	8	6	7	67.4	33.0	33.0	37.0	7	15	76.5	7	15	43.0	6	8	6	6.5	66.0	142	154	166	7	6.5	68.0	5	12	5	8 1	12
8 FT	14	15	10	10	6	8	6	6.5	62.0	34.0	34.0	38.0	7	14	72.0	7	14	42.0	6	7.5	6	6.5	62.1	143	155	167	7	6	67.0	5	12	5	8	o
10 FT	15	17	10	10	6	8	6	6.5	64.6	35.0	35.0	39.0	7	14	78.0	7	14	49.5	6	7	6	6.5	59.6	145	157	169	7	6.5	67.0	5	12	5	8	0
12 FT	16	18	11	10	6	7.5	6	6.5	62.6	36.0	36.0	40.0	7	13	76.5	7	13	49.0	6	6.5	6	7.5	57.4	146	158	170	7	6	67.0	5	12	5	7.5	0
14 FT	18	20	12	10	6	7	6	7	62.0	38.0	38.0	42.0	7	13	75.5	7	13	49.0	6	6	6	8	56.4	148	160	172	7	6.5	67.0	5	12	5	7	0
16 FT	19	21	12	10	6	6.5	6	6.5	60.9	39.0	39.0	43.0	7	13	74.5	7	13	48.5	7	8	6	7.5	55.4	149	161	173	7	6	66.5	5	12	5	7	0
18 FT	21	22	12	10	6	6	6	6.5	59.8	41.0	45.0	45.0	7	13	74.0	7	13	48.5	7	7	6	6	54.6	150	162	174	7	6	66.5	5	12	5	7	0
20 FT	22	24	13	10	6	6	6	6.5	59.9	42.0	42.0	46.0	7	12	73.5	7	12	48.5	7	7	6	7.5	54.4	152	164	176	7	6	66.5	5	12	5	6.5	0
22 FT	23	26	13	10	7	7	6	6	59.3	43.0	43.0	47.0	7	12	72.5	7	12	48.0	7	7	6	7	53.9	154	166	178	7	6	66.5	5	12	5	6.5	0
24 FT	25	28	14	10	7	7	6	6	59.5	45.0	45.0	49.0	7	12	71.5	7	12	48.0	7	7	6	7.5	54.0	156	168	180	7	6	66.5	5	12	5	6	0
26 FT	26	29	14	10	7	6.5	6	6	59.0	50.0	50.0	50.0	7	12	71.0	7	12	47.5	7	7	6	7.5	53.6	157	169	181	8	7	72.5	5	12	5	6	0
28 FT	27	31	15	10	7	6	6	6	59.6	51.0	51.0	51.0	7	12	70.5	7	12	47.5	7	7	6	7.5	53.9	159	171	183	8	7	72.5	5	12	6	8	0
30 FT	29	32	15	10	7	6	7	8	64.3	53.0	53.0	53.0	7	12	69.0	7	12	47.0	7	6.5	6	7.5	54.0	160	172	184	8	7	72.5	5	12	6	8	0
32 FT	30	33	16	10	7	6	6	6	59.9	54.0	54.0	54.0	7	12	68.0	7	12	46.5	7	6	6	7	54.3	161	173	185	8	6.5	72.5	5	12	6	8	의
34 FT	31	35	16	10	8	7.5	6	6	58.3	55.0	55.0	55.0	8	15	75.0	8	15	53.0	7	6.5	6	6.5	52.6	163	175	187	8	6.5	72.5	5	12	6	8	의
36 FT	32	36	16	10	8	7.5	7	7.5	63.1	56.0	56.0	56.0	8	14	74.0	8	14	52.5	7	6.5	6	6.5	52.8	164	176	188	8	6	72.5	5	12	6	8	의
38 FT	33	37	16	10	8	7	7	7	63.1	57.0	57.0	57.0	8	14	72.5	8	14	52.0	7	6	6	6.5	52.9	165	177	189	8	6	72.5	5	12	6	8	의
40 FT	34	38	17	10	8	7	7	7.5	63.9	58.0	58.0	58.0	8	14	72.0	8	14	51.0	7	6	6	6	53.3	166	178	190	8	6	72.5	5	12	6	7.5	의
42 FT	35	40	18	10	8	6.5	7	7.5	64.8	59.0	59.0	59.0	8	13	71.5	8	13	50.0	7	6	6	6	53.8	168	180	192	9	7	78.5	5	12	6	7	의
44 FT	36	41	18	10	8	6.5	7	7.5	64.6	60.0	60.0	66.0	8	13	71.0	8	13	49.5	7	6	7	8	56.9	169	181	193	9	7	78.5	5	12	6	7	0
46 FT	37	42	18	10	8	6.5	7	6.5		61.0	61.0	67.0	8	12	70.5	8	12	48.5	7	6	7	7.5	57.0	170	182	194	9	7	78.5	5	12	6	7	의
48 FT	38	43	19	10	8	6	7	7	65.4	62.0		68.0	8	13	69.5	8	13	48.0	8	7.5	7	7.5	57.5	171	183	195	9	7	78.5	5	12	6		<u>0</u>
50 FT	39	44	19	10	8	6	7	6.5	65.3	63.0	63.0	69.0	8	13	69.0	8	13	47.5	8	7.5	7	7	57.6	172	184	196	9	6.5	78.5	5	12	6	6.5	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 15 FEET HE[GHT (HT): 8 THRU 13 FEET

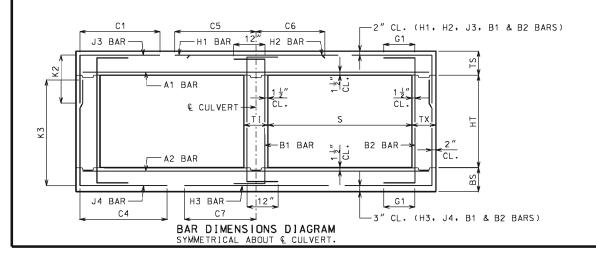
DATE EFFECTIVE: DATE PREPARED:

9/8/2011

703.47

7 24 OF 27

										SPAI	V (S)	= 15	FT			HE I	IGHT	(HT)	= '	14 FT	OR	15	FT OR	: 16 F	- T									一
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	B BAR	S					₩AL	L BAI	RS	
DESIGN		THIC	(NES	S	Α1	BARS			J3	BARS				H1 B#	RS.		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	В1	BARS	B2	2 BARS	ŝ
FILL	TS	BS	ТХ	ΙΤ	SIZE	SPA.	SIZE	SPA.	C1	HT=14'	K2 HT=15'	HT=16'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=14′	K3 HT=15′	HT=16	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	12	13	6	8	6	8.5	79.3	35.0	35.0	39.0	6	16	152.5	6	16	50.0	5	6	6	7	102.4	177	189	201	6	6	67.5	5	11	5	7	12
2 FT	16	14	12	13	6	7.5	5	6	76.3	36.0	36.0	36.0	6	15	149.5	6	15	48.5	6	8	6	7.5	96.3	178	190	202	6	6	67.0	5	12	5	7	12
4 FT	12	13	12	13	6	7	6	7	101.4	36.0	36.0	36.0	6	12	86.5	6	12	41.5	5	6	6	6.5	88.5	177	189	201	7	6.5	69.0	5	10.5	5	7	12
6 FT	13	14	12	13	6	8	6	6.5	86.3	37.0	37.0	37.0	7	16	74.5	7	16	43.5	6	8	6	6.5	82.9	178	190	202	7	6	68.0	5	12	5	7	12
8 FT	13	15	13	13	6	8	6	6.5	76.4	37.0	37.0	37.0	7	14	70.5	7	14	42.5	6	7.5	6	6.5	77.9	179	191	203	7	6	68.0	5	12	5	6.5	0
10 FT	15	17	13	13	6	8	6	6	80.6	39.0	39.0	39.0	7	14	77.5	7	14	50.5	6	7	6	6.5	76.0	181	193	205	7	6.5	67.5	5	12	5	6.5	0
12 FT	16	18	14	13	6	8	6	6	78.4	40.0	40.0	40.0	7	14	76.5	7	14	50.0	6	6.5	6	6.5	73.8	182	194	206	7	6	67.5	5	12	5	6	0
14 FT	17	20	14	13	6	7.5	7	7.5	81.6	41.0	41.0	41.0	7	13	75.5	7	13	50.0	6	6	6	6	72.9	184	196	208	7	6	67.5	5	12	5	6	0
16 FT	19	21	15	13	6	6.5	7	8	80.9	43.0	43.0	49.0	7	13	75.0	7	13	49.5	7	8	7	8	74.4	185	197	209	7	6	67.0	5	12	6	8	0
18 FT	20	23	16	13	6	6.5	7	8	80.1	44.0	44.0	44.0	7	13	74.0	7	13	49.5	7	7.5	6	6	70.8	187	199	211	7	6	67.0	5	12	6	8	0
20 FT	21	24	17	13	6	6	7	7.5	79.5	45.0	45.0	45.0	7	12	73.5	7	12	49.5	7	7	6	6	69.8	188	200	212	7	6	67.0	5	12	6	7.5	0
22 FT	23	26	17	13	7	7.5	7	7.5	78.9	47.0	47.0	47.0	7	12	73.0	7	12	49.0	7	7	6	6	69.4	190	202	214	7	6	67.0	5	12	6	7.5	0
24 FT	24	28	18	13	7	7	7	7.5	78.6	48.0	48.0	48.0	7	12	72.5	7	12	49.0	7	7	6	6.5	69.0	192	204	216	7	6	67.0	5	12	6	7	0
26 FT	26	29	18	13	7	7	7	7	78.1	50.0	50.0	50.0	7	12	71.5	7	12	49.0	7	6	6	6	68.5	193	205	217	8	7	73.0	5	12	6	7	0
28 FT	27	31	19	13	7	6.5	7	7	78.5	51.0	51.0	51.0	7	12	71.0	7	12	48.5	7	6.5	6	6	68.6	195	207	219	8	7	73.0	5	12	6	6.5	0
30 FT	28	32	19	13	7	6	7	6	78.1	52.0	52.0	52.0	7	12	70.5	7	12	48.5	7	6.5	6	6	68.5	196	208	220	8	7	73.0	5	12	6	6.5	0
32 FT	30	34	20	13	7	6	7	6.5	78.8	54.0	54.0	54.0	7	12	69.0	7	12	47.0	7	6.5	6	6	68.9	198	210	222	8	6.5	73.0	5	12	6	6.5	0
34 FT	31	35	20	13	7	6	7	6.5	76.3	55.0	55.0	55.0	8	15	76.0	8	15	54.0	7	6.5	6	6	66.4	199	211	223	8	6.5	73.0	5	12	6	6.5	0
36 FT	32	36	21	13	8	7.5	7	6.5	76.8	56.0	56.0	56.0	8	14	75.0	8	14	53.5	7	6	6	6	66.6	200	212	224	8	6	73.0	5	12	6	6	0
38 FT	33	37	21	13	8	7	7	6	76.8	57.0	57.0	57.0	8	14	74.0	8	14	53.0	7	6	6	6	66.6	201	213	225	8	6	73.0	5	12	6	6	0
40 FT	34	39	22	13	8	7	7	6	77.5	58.0	58.0	64.0	8	14	73.0	8	14	52.0	7	6	7	7.5	70.1	203	215	227	8	6	73.0	5	12	6	6	0
42 FT	35	40	23	13	8	7	7	6.5	78.1	59.0	59.0	65.0	8	13	72.5	8	13	51.0	7	6	7	7.5	70.4	204	216	228	9	7	79.0	5	12	7	7.5	0
44 FT	35	41	24	13	8	6	7	6	78.9	65.0	65.0	65.0	8	12	72.5	8	12	52.0	8	7.5	7	7	70.6	205	217	229	9	7	79.5	5	12	7	8	0
46 FT	36	42	25	13	8	6	7	6	79.5	66.0	66.0	66.0	8	12	72.0	8	12	51.0	8	7	7	7.5	70.9	206	218	230	9	7	79.5	5	12	7	8	0
48 FT	37	43	26	13	8	6.5	7	6	80.3	67.0	67.0	67.0	8	12	71.5	8	12	50.0	8	6.5	7	7.5	71.3	207	219	231	9	7	79.5	5	12	7	8	0
50 FT	38	45	27	13	8	6	7	6	81.1	68.0	68.0	68.0	8	12	71.0	8	12	49.0	8	7	7	7	71.8	209	221	233	9	6.5	79.5	5	12	7	8	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 15 FEET HE[GHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

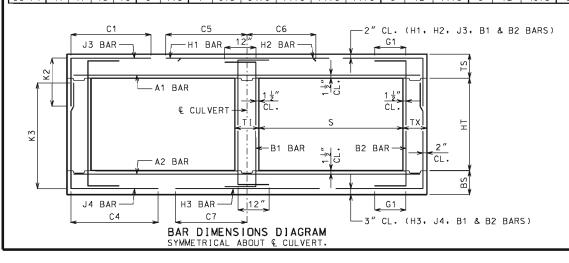
9/8/2011

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SHEET NO. 25 OF 27

										SP	AN (S	) = 1	6 F	Т		HE	I GH	Г (НТ	) =	8 F1	OR	9 F	T OR	10 F	Γ									丁
		MEM									TOP SL	AB BARS	S										BOTT	OM SLA	B BAR	S					WAL	L BA	ıRS	
DESIGN		THICK	(NESS	S	Α1	BARS			J3	BARS				H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1 I	BARS	B2	2 BARS	
FILL	TS	ВЅ	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	12	8	8	6	7.5	5	8	76.5	35.0	35.0	35.0	6	15	154.5	6	15	54.0	5	6	6	7	66.9	104	116	128	7	7	72.5	5	12	5	12	12
2 FT	17	13	8	8	6	7	5	6.5	76.5	37.0	37.0	37.0	6	14	154.5	6	14	50.0	5	6	5	6	56.4	105	117	129	7	7	71.5	5	12	5	12	12
4 FT	13	13	8	8	6	6.5	6	7	55.6	33.0	33.0	33.0	7	14	97.0	7	14	45.5	5	6	5	6	49.6	105	117	129	7	6	71.0	5	12	5	12	12
6 FT	14	14	8	8	6	7	5	6	47.1	34.0	34.0	34.0	7	14	82.0	7	14	44.0	6	8	5	6	45.1	106	118	130	7	6	70.5	5	12	5	12	12
8 FT	15	16	8	8	6	7.5	5	6	48.4	35.0	35.0	35.0	7	13	84.0	7	13	51.0	6	7	5	7	41.9	108	120	132	7	6	70.0	5	12	5	11	0
10 FT	16	17	8	8	6	7	6	8	49.6	36.0	36.0	36.0	7	12	81.5	7	12	50.5	6	7	5	6.5	39.9	109	121	133	7	6	69.5	5	12	5	10	0
12 FT	18	19	8	8	6	7	6	7.5	47.5	38.0	38.0	38.0	7	12	80.0	7	12	50.0	6	6	5	6	38.6	111	123	135	7	6	69.5	5	12	5	9.5	0
14 FT	19	20	8	8	6	6.5	6	7	46.0	39.0	39.0	43.0	7	12	79.0	7	12	49.5	6	6	6	7.5	40.5	112	124	136	7	6	69.5	5	12	5	9.5	0
16 FT	21	22	8	8	6	6	6	7	44.9	45.0	45.0	45.0	7	12	78.0	7	12	49.5	7	7.5	6	7	39.9	114	126	138	7	6	69.5	5	12	5	8.5	0
18 FT	22	23	9	8	6	6	6	7.5	45.1	42.0	42.0	42.0	8	15	85.0	8	15	57.0	7	6.5	5	6	36.8	115	127	139	8	6.5	75.5	5	12	5	8.5	0
20 FT	24	25	9	8	7	7.5	6	7	44.4	48.0	48.0	48.0	8	15	84.0	8	15	57.0	7	7	6	7	39.4	117	129	141	8	7	75.5	5	12	5	8.5	0
22 FT	25	27	10	8	7	7	6	7.5	45.0	45.0	45.0	49.0	8	14	83.5	8	14	56.5	7	6.5	6	7	39.5	119	131	143	8	7	75.5	5	12	5	8	0
24 FT	27	29	10	8	7	6.5	6	6.5	44.5	51.0	51.0	51.0	8	14	82.5	8	14	56.5	7	6.5	6	6.5	39.3	121	133	145	8	7	75.0	5	12	5	8	0
26 FT	28	31	11	8	7	6	6	7.5	45.3	52.0	52.0	52.0	8	14	81.5	8	14	56.0	7	6.5	6	7	39.5	123	135	147	8	7	75.0	5	12	5	7.5	0
28 FT	30	32	11	8	7	6	6	7	44.9	54.0	54.0	54.0	8	14	80.5	8	14	56.0	7	6.5	6	6.5	39.6	124	136	148	8	7	75.0	5	12	5	7.5	0
30 FT	31	34	11	8	8	7.5	6	6	44.9	55.0	55.0	55.0	8	14	79.5	8	14	55.5	7	6.5	6	6	39.6	126	138	150	8	6.5	75.0	5	12	5	7	0
32 FT	32	35	12	8	8	7	6	7	45.8	56.0	56.0	56.0	8	14	78.5	8	14	55.0	7	6	6	6.5	40.0	127	139	151	8	6.5	75.0	5	12	5	7	0
34 FT	33	36	12	8	8	7	6	7	45.3	57.0	57.0	57.0	8	14	77.5	8	14	54.5	7	6	6	6.5	39.3	128	140	152	8	6	75.0	5	12	5	7	0
36 FT	35	38	12	8	8	6.5	6	6.5	45.3	59.0	59.0	59.0	8	13	75.0	8	13	52.0	7	6	6	6	39.3	130	142	154	8	6	75.0	5	12	5	7	0
38 FT	36	39	12	8	8	6.5	6	6.5	45.3	60.0	60.0	60.0	8	13	74.0	8	13	51.5	7	6	6	6	39.3	131	143	155	8	6	75.0	5	12	5	6.5	0
40 FT	37	41	12	8	8	6.5	6	6	45.3	61.0	61.0	61.0	8	12	73.5	8	12	50.5	7	6	7	6.5	42.5	133	145	157	9	7	80.5	5	11	5	6	0
42 FT	38	42	12	8	8	6	6	6	45.3	62.0	62.0	62.0	8	12	73.0	8	12	50.0	7	6	7	6	42.6	134	146	158	9	7	80.5	5	7	6	8	0
44 FT	39	43	13	9	8	6	6	6	45.8	63.0	63.0	63.0	8	12	73.5	8	12	50.5	8	7.5	7	6.5	43.1	135	147	159	9	7	81.0	5	12	5	6	0
46 FT	40	44	13	9	8	6	7	7	50.8	70.0	70.0	70.0	8	12	73.0	8	12	49.5	8	7.5	7	6.5	43.4	136	148	160	9	6.5	80.5	5	12	6	8	0
48 FT	41	45	13	9	9	7.5	7	7	50.8	71.0	71.0	71.0	9	15	80.5	9	15	56.5	8	7	7	6.5	43.5	137	149	161	9	6.5	80.5	5	12	6	7.5	0
50 FT	42	46	13	9	9	7	7	6.5	50.8	72.0	72.0	72.0	9	14	80.0	9	14	56.0	8	7	7	6	43.8	138	150	162	9	6.5	80.5	5	9.5	6	7	0

, and the second			Ť	Ī		, and the second		, and the second		SPA	N (S)	= 16	FT	, and the second	•	HE:	IGHT	(HT)	= 1	1 F1	OR	12	FT OF	₹ 13 F	T	, and the second	,							
		MEM									TOP SL.	AB BAR	S										BOTT	TOM SLA	B BARS	S					WAL	L BA	RS	
DESIGN		THIC	KNESS	5	A1	BARS			J3	BARS				H1 BA	\RS		H2 B4	ARS	A2	BARS			J4	BARS				нз ва	RS	B1 6	BARS	B2	2 BARS	3
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=11'	K2 HT=12	HT=13'	SIZE	SPA.	C5	SIZE	SPA.	C6	SIZE	SPA.	SIZE	SPA.	C4	HT=111	K3 HT=12′	HT=13′	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	9	10	6	7.5	5	6	77.5	35.0	35.0	35.0	6	15	155.5	6	15	53.5	5	6	6	6	89.5	141	153	165	6	6	70.0	5	11.5	5	8.5	12
2 FT	17	14	9	10	6	7.5	5	6.5	77.5	37.0	37.0	37.0	6	14	155.5	6	14	50.0	6	8	6	6.5	79.8	142	154	166	6	6	69.5	5	12	5	8.5	12
4 FT	13	13	10	10	6	6.5	6	7	76.9	33.0	37.0	37.0	7	15	96.5	7	15	46.0	5	6	6	6.5	70.0	141	153	165	7	6	71.5	5	11	5	8.5	1:
6 FT	13	14	10	10	6	7	6	7	65.3	33.0	37.0	37.0	7	13	79.5	7	13	44.0	6	8	6	6.5	64.5	142	154	166	7	6	71.0	5	12	5	8	12
8 FT	14	16	10	10	6	7	6	6.5	60.3	34.0	34.0	38.0	7	13	75.0	7	13	43.0	6	7	6	7	60.6	144	156	168	7	6	70.5	5	12	5	8	0
10 FT	16	17	10	10	6	7	6	6.5	63.1	36.0	40.0	40.0	7	13	81.5	7	13	51.0	6	7	6	6.5	57.8	145	157	169	7	6	70.0	5	12	5	8	С
12 FT	17	19	11	10	6	7	6	6.5	62.3	37.0	37.0	41.0	7	12	80.0	7	12	50.5	6	6	6	7.5	56.5	147	159	171	7	6	70.0	5	12	5	7.5	С
14 FT	19	21	12	10	6	6.5	6	7	61.5	39.0	39.0	43.0	7	12	78.5	7	12	50.5	7	8	6	8	55.8	149	161	173	7	6	70.0	5	12	5	7	(
I6 FT	20	22	12	10	6	6.5	6	6.5	60.3	40.0	40.0	44.0	7	12	78.0	7	12	50.0	7	7.5	6	7	54.6	150	162	174	7	6	70.0	5	12	5	7	(
18 FT	22	24	12	10	6	6	6	6	59.3	42.0	46.0	46.0	7	12	77.0	7	12	50.0	7	7	6	6.5	54.0	152	164	176	7	6	69.5	5	12	5	7	(
20 FT	23	25	13	10	7	7.5	6	6	59.1	43.0	43.0	47.0	8	15	84.5	8	15	57.5	7	6.5	6	7	53.6	153	165	177	8	7	75.5	5	12	5	6.5	(
22 FT	25	27	13	10	7	7	6	6	58.4	45.0	45.0	49.0	8	15	83.5	8	15	57.5	7	6.5	6	7	53.1	155	167	179	8	7	75.5	5	12	5	6.5	(
24 FT	27	29	14	10	7	6.5	6	6	58.6	51.0	51.0	51.0	8	15	82.5	8	15	57.0	7	6.5	6	7.5	53.3	157	169	181	8	7	75.5	5	12	5	6	
26 FT	28	31	14	10	7	6.5	6	6	58.3	52.0	52.0	52.0	8	14	82.0	8	14	57.0	7	6.5	6	7.5	52.9	159	171	183	8	7	75.5	5	12	5	6	
28 FT	30	33	15	10	7	6	6	6	58.8	54.0	54.0	54.0	8	15	80.5	8	15	56.5	7	6.5	6	7	53.3	161	173	185	8	6.5	75.5	5	12	6	8	_
30 FT	31	34	15	10	8	7.5	7	8	63.5	55.0	55.0	55.0	8	15	79.5	8	15	56.0	7	6	6	7	53.1	162	174	186	8	6.5	75.5	5	12	6	8	
32 FT	32	35	15	10	8	7.5	7	7	63.3	56.0	56.0	56.0	8	14	79.0	8	14	55.5	7	6	6	6.5	53.0	163	175	187	8	6.5	75.5	5	12	6	8	
34 FT	33	37	16	10	8	7	7	7.5	64.0	57.0	57.0	57.0	8	14	77.5	8	14	55.0	7	6	6	6.5	53.5	165	177	189	8	6	75.5	5	12	6	8	(
36 FT	34	38	16	10	8	7	7	7.5	62.4	58.0	58.0	58.0	8	14	76.5	8	14	54.0	7	6	6	6	51.9	166	178	190	8	6	75.5	5	12	6	8	(
38 FT	35	40	16	10	8	6.5	7	7	62.4	59.0	59.0	59.0	8	13	75.0	8	13	53.5	7	6	6	6	52.0	168	180	192	9	7	81.5	5	12	6	8	С
40 FT	36	41	17	10	8	6	7	7.5	63.1	60.0	60.0	66.0	8	12	74.5	8	12	52.5	8	7.5	7	8	55.5	169	181	193	9	7	81.5	5	12	6	7.5	С
42 FT	38	42	17	10	8	6	7	7.5	62.9	62.0	62.0	68.0	8	12	73.5	8	12	50.0	8	7.5	7	7.5	55.8	170	182	194	9	7	81.5	5	12	6	7.5	0
44 FT	39	43	18	10	8	6	7	7.5	63.8	63.0	63.0	69.0	8	12	73.0	8	12	49.0	8	7	7	7.5	56.1	171	183	195	9	7	81.5	5	12	6	7	C
46 FT	40	44	18	10	8	6	7	7.5	63.6	70.0	70.0	70.0	8	12	72.0	8	12	48.5	8	6.5	7	7	56.3	172	184	196	9	6.5	81.5	5	12	6	7	C
48 FT	40	46	19	10	8	6	7	7	64.8	70.0	70.0	70.0	8	12	72.0	8	12	49.0	8	7	7	7	56.6	174	186	198	9	6.5	81.5	5	12	6	6.5	
50 FT	41	47	19	10	9	7.5	7	6.5	64.6	71.0	71.0	71.0	8	12	71.5	8	12	48.5	8	7	7	6.5	56.9	175	187	199	9	6	81.5	5	12	6	6.5	С



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 16 FEET HE[GHT (HT): 8 THRU 13 FEET

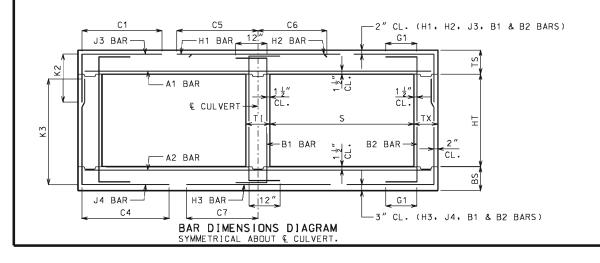
DATE EFFECTIVE: DATE PREPARED:

10/01/2011 9/8/2011

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SHEET NO. 26 OF 27

										SPAI	V (S)	= 16	FΤ			HE :	IGHT	(HT)	= '	14 FT	OR	15	FT OF	₹ 16 [	- T									$\overline{}$
		MEM									TOP SL	AB BARS	5										BOTT	OM SLA	B BAR	S					₩AL	L BAI	RS	
DESIGN		THIC	(NES	S	Α1	BARS			J3	BARS				H1 BA	RS		H2 BA	RS	A2	BARS			J4	BARS				НЗ ВА	RS	B1 I	BARS	B2	BAR	i i
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=14'	K2 HT=15'	HT=16'	SIZE	SPA.	C5	S I ZE	SPA.	C6	SIZE	SPA.	S I ZE	SPA.	C4	HT=14	K3 HT=15'	HT=16	SIZE	SPA.	C7	SIZE	SPA.	SIZE	SPA.	G1
1 FT	15	13	12	13	6	7.5	6	8	82.9	35.0	35.0	39.0	6	15	160.5	6	15	53.0	5	6	6	7	101.1	177	189	201	6	6	70.5	5	10	5	7	12
2 FT	17	14	12	13	6	7.5	6	8.5	82.9	37.0	37.0	41.0	6	14	160.5	6	14	50.0	6	8	6	7	95.1	178	190	202	7	7	73.0	5	12	5	7	12
4 FT	13	13	12	13	6	7	6	7	99.8	37.0	37.0	37.0	7	15	94.0	7	15	46.0	6	8.5	6	6	86.1	177	189	201	7	6	72.0	5	11	5	7	12
6 FT	13	15	12	13	6	7	6	6.5	82.6	37.0	37.0	37.0	7	14	77.5	7	14	44.5	6	7.5	6	6.5	82.5	179	191	203	7	6	71.5	5	12	5	7	12
8 FT	14	16	13	13	6	7.5	6	6.5	76.6	38.0	38.0	38.0	7	13	74.5	7	13	44.0	6	7	6	6.5	77.6	180	192	204	7	6	71.0	5	12	5	6.5	0
10 FT	15	18	13	13	6	6.5	6	6	79.5	39.0	39.0	39.0	7	13	80.5	7	13	51.5	6	6.5	6	6	75.6	182	194	206	7	6	71.0	5	12	5	6.5	0
12 FT	17	19	14	13	6	7	6	6	77.8	41.0	41.0	41.0	7	13	79.5	7	13	51.5	6	6	6	6	73.1	183	195	207	7	6	70.5	5	12	5	6	0
14 FT	18	21	15	13	6	7	6	6	76.3	42.0	42.0	42.0	7	12	78.5	7	12	51.0	7	8	6	6	71.8	185	197	209	7	6	70.5	5	12	6	8	0
16 FT	20	22	15	13	6	6.5	7	7.5	79.9	44.0	44.0	44.0	7	12	78.0	7	12	51.0	7	7.5	6	6	70.3	186	198	210	7	6	70.0	5	12	6	8	0
18 FT	22	24	15	13	6	6	7	7	78.8	46.0	46.0	52.0	7	12	77.5	7	12	51.0	7	7	7	7	72.4	188	200	212	7	6	70.0	5	12	6	8	0
20 FT	23	25	16	13	7	7.5	7	7	78.0	47.0	47.0	53.0	8	15	85.0	8	15	58.5	7	6	7	7.5	71.4	189	201	213	8	7	76.0	5	12	6	8	0
22 FT	25	27	17	13	7	7	7	7.5	77.8	49.0	49.0	49.0	7	12	76.0	7	12	50.5	7	6	6	6	68.0	191	203	215	8	7	76.0	5	12	6	7.5	0
24 FT	26	29	17	13	7	7	7	7	76.9	50.0	50.0	56.0	8	15	83.5	8	15	58.5	7	6.5	7	7.5	70.4	193	205	217	8	7	76.0	5	12	6	7.5	0
26 FT	28	31	18	13	7	6.5	7	7	76.9	52.0	52.0	52.0	8	15	82.5	8	15	58.0	7	6.5	6	6	67.1	195	207	219	8	7	76.5	5	12	6	7	0
28 FT	29	33	19	13	7	6	7	7	77.1	53.0	53.0	53.0	8	15	82.0	8	15	58.0	7	6	6	6	67.1	197	209	221	8	6.5	76.5	5	12	6	6.5	0
30 FT	31	34	19	13	8	7.5	7	6.5	76.8	55.0	55.0	55.0	8	15	80.5	8	15	57.0	7	6	6	6	67.0	198	210	222	8	6.5	76.0	5	12	6	6.5	0
32 FT	32	36	20	13	8	7.5	7	6.5	77.3	56.0	56.0	56.0	8	14	79.5	8	14	56.5	7	6	6	6	67.3	200	212	224	8	6	76.5	5	12	6	6.5	0
34 FT	33	37	21	13	8	7	7	6.5	77.6	57.0	57.0	57.0	8	14	78.5	8	14	55.5	7	6	6	6	67.3	201	213	225	8	6	76.5	5	12	6	6	0
36 FT	34	38	21	13	8	7	7	6.5	75.5	58.0	58.0	58.0	8	14	77.5	8	14	55.0	8	7	6	6	64.9	202	214	226	8	6	76.5	5	12	6	6	0
38 FT	35	40	21	13	8	6.5	7	6	75.5	59.0	59.0	59.0	8	13	76.5	8	13	54.0	8	7.5	6	6	65.1	204	216	228	9	7	82.0	5	12	6	6	0
40 FT	36	41	22	13	8	6.5	7	6	76.1	66.0	66.0	66.0	8	13	75.5	8	13	53.5	8	7.5	7	7.5	68.5	205	217	229	9	7	82.0	5	12	6	6	0
42 FT	37	42	23	13	8	6.5	7	6.5	76.9	67.0	67.0	67.0	8	12	75.0	8	12	52.5	8	6.5	7	7.5	68.8	206	218	230	9	7	82.5	5	12	7	7.5	0
44 FT	38	44	24	13	8	6	7	6	77.6	68.0	68.0	68.0	8	12	74.5	8	12	52.0	8	7	7	7	69.4	208	220	232	9	6.5	82.5	5	12	7	7.5	0
46 FT	39	45	25	13	8	6	7	6	78.4	69.0	69.0	69.0	8	12	74.0	8	12	51.0	8	7	7	7	69.8	209	221	233	9	6.5	82.5	5	12	7	7.5	0
48 FT	40	46	26	13	8	6	7	6	79.1	70.0	70.0	70.0	8	12	73.5	8	12	50.0	8	6.5	7	7	70.1	210	222	234	9	6.5	82.5	5	12	7	8	0
50 FT	41	47	27	13	9	7.5	7	6	79.9	71.0	71.0	71.0	8	12	73.0	8	12	49.5	8	6	7	6.5	70.5	211	223	235	9	6	82.5	5	12	7	8	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE DOUBLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

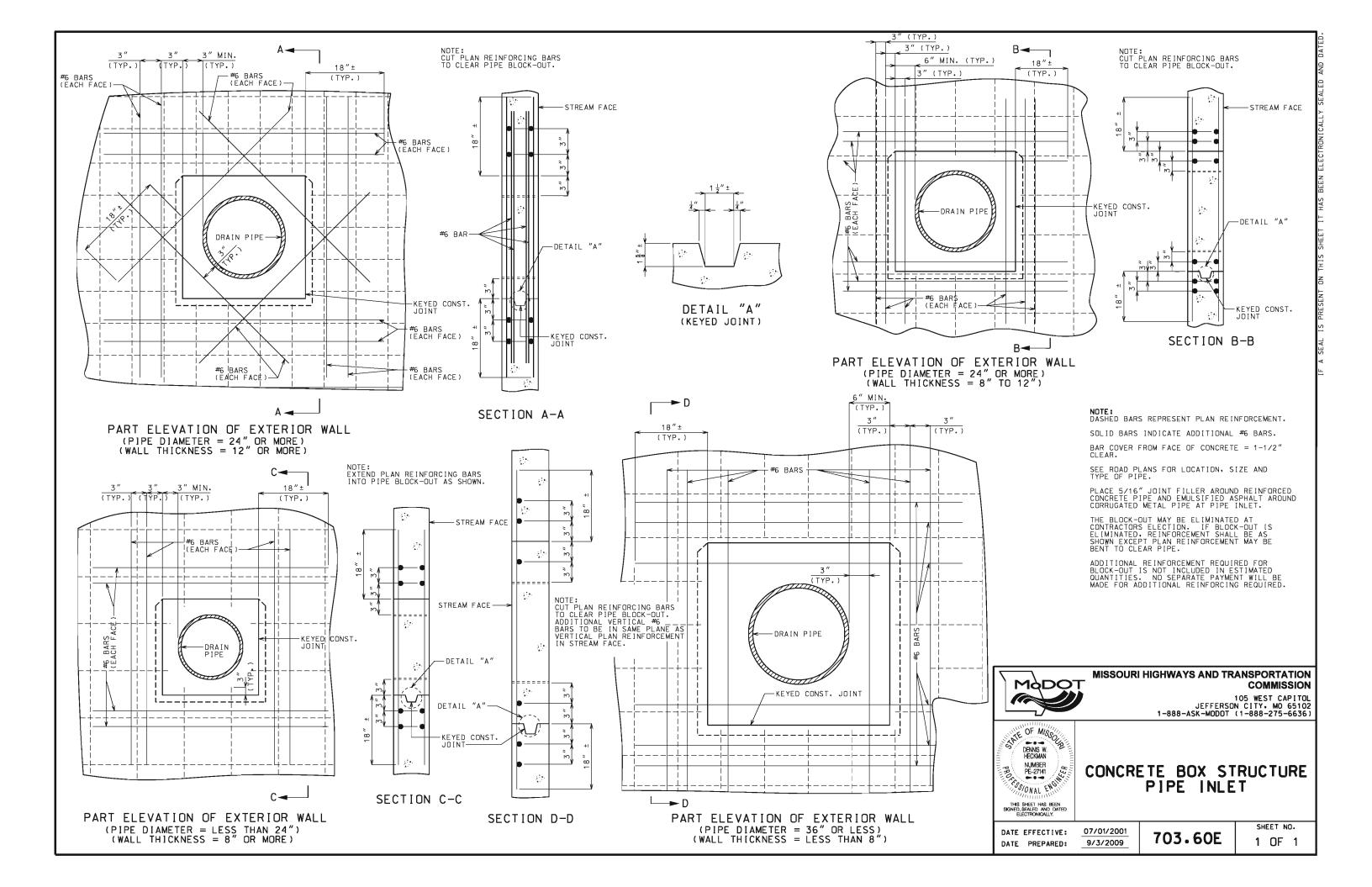
SPAN (S): 16 FEET HE[GHT (HT): 14 THRU 16 FEET

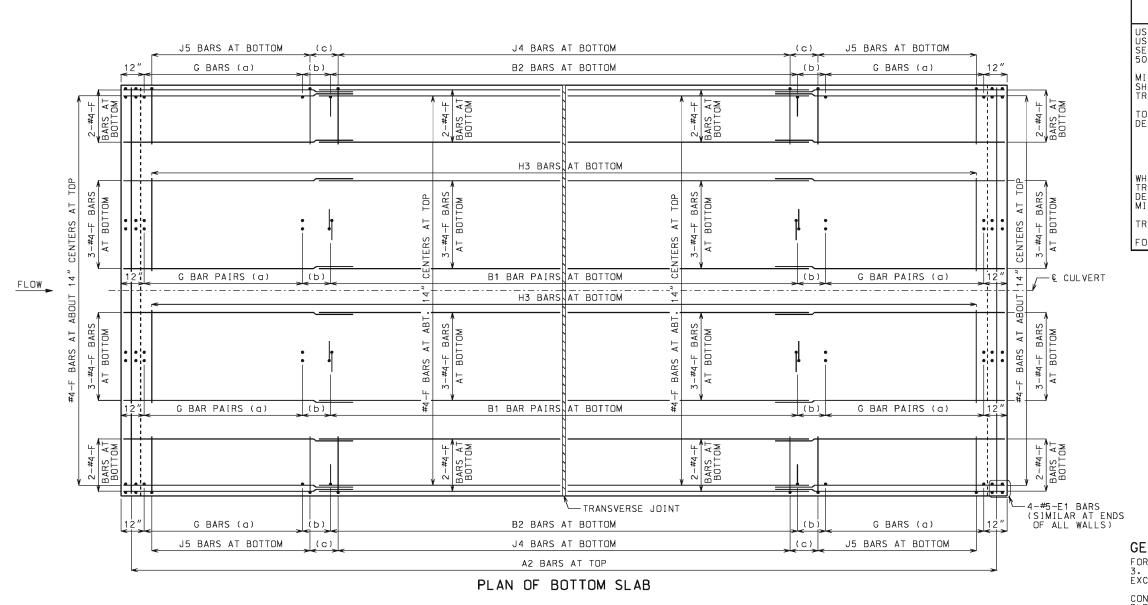
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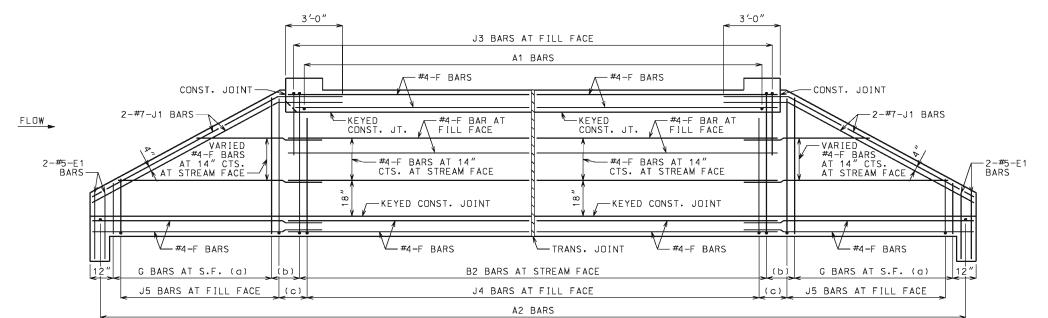
9/8/2011

703.47

SHEET NO. 27 OF 27







#### ELEVATION OF EXTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT T

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## **CONCRETE** TRIPLE BOX CULVERT

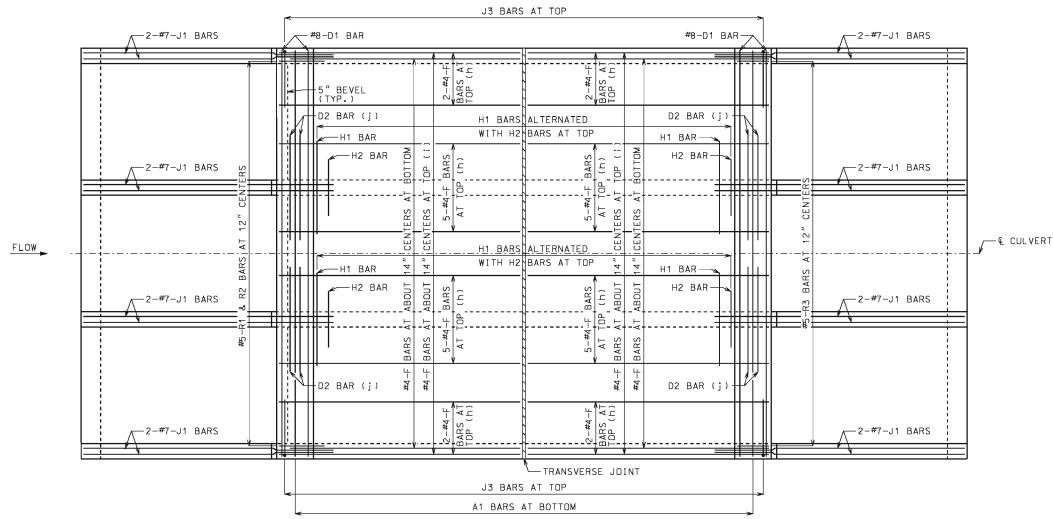
SKEW: SQUARED WINGS: STRAIGHT

REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 12/01/2011 5/13/2015

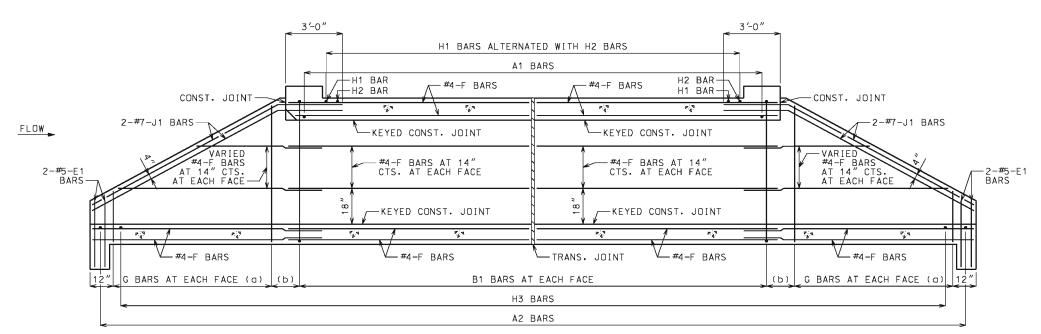
703.80H

SHEET NO. 1 OF 3



#### PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY, FOR PLACEMENT, SEE SHEET 1 OF 3.



## SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 \frac{1}{2}".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) NOT SPECIFIED ON THIS SHEET
- (e) NOT SPECIFIED ON THIS SHEET
- (f) NOT SPECIFIED ON THIS SHEET
- (g) NOT SPECIFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR \$\frac{1}{4}\$ CLEAR SPAN, THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



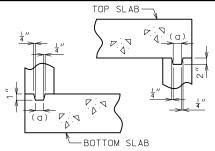
## **CONCRETE** TRIPLE BOX CULVERT

SKEW: SQUARED WINGS: STRAIGHT

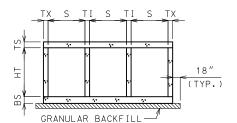
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 12/01/2011 703.80H 5/13/2015

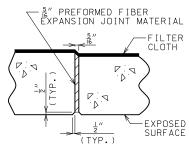
SHEET NO. 2 OF 3



#### KEYED CONSTRUCTION JOINT (a) APPROXIMATELY ONE-THIRD OF WALL



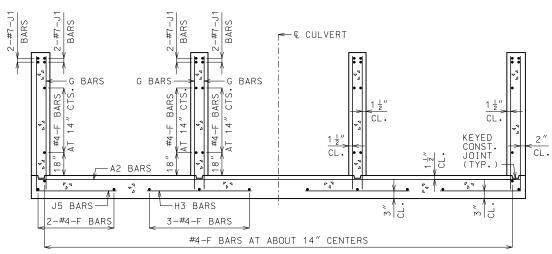
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



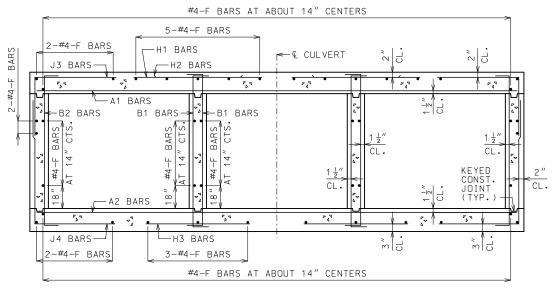
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

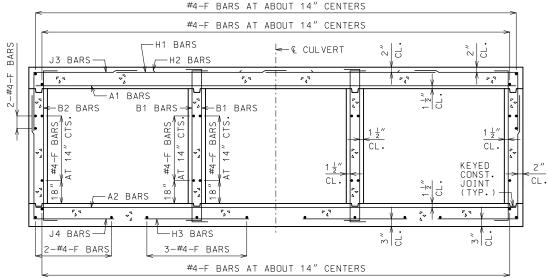
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



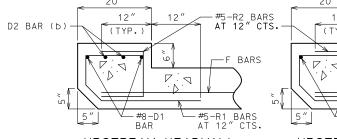
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



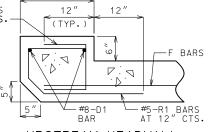
BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



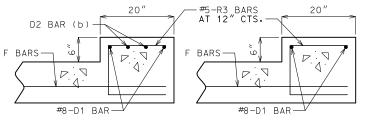
BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN



REINFORCEMENT NEAR INTERIOR WALL

DOWNSTREAM HEADWALL DOWNSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

## MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 $\frac{1}{2}^{\prime\prime}$ .

HEADWALL.

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

NORMAL TO LONG DIRECTION OF

DRAWING NOT TO SCALE. FOLLOW

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE DENNIS W. HECKMAN NUMBER PE-27141 PEZ. THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

CONCRETE

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



MODOT

TRIPLE BOX CULVERT SKEW: SQUARED

WINGS: STRAIGHT

SECTIONS

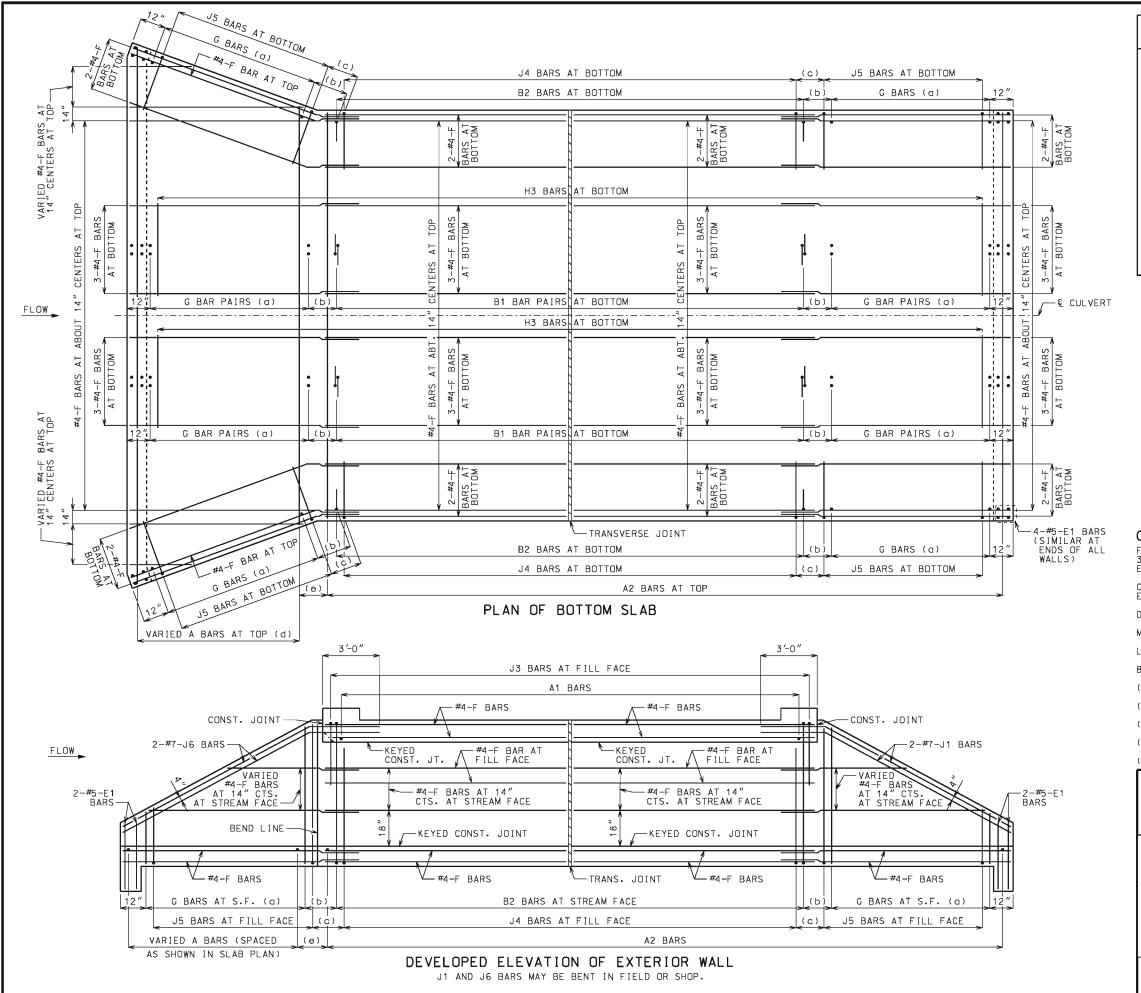
DATE EFFECTIVE: DATE PREPARED:

01/01/2021 10/14/2020 703.80H

SHEET NO. 3 OF 3

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0' #9 FOR CLEAR SPAN > 13'-0'

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF © WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

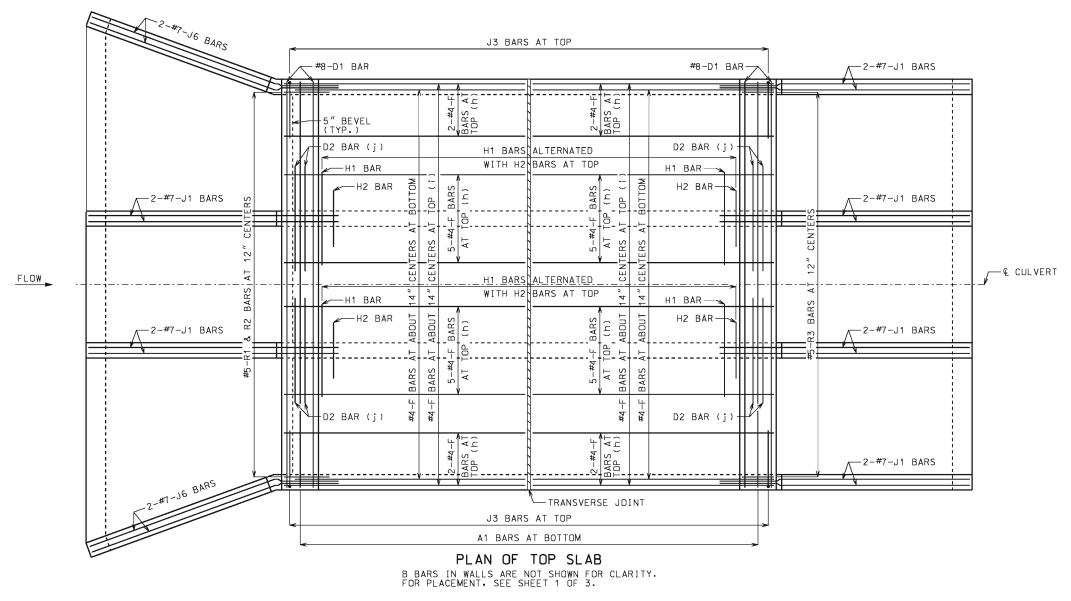
SKEW: SQUARED WINGS: FLARED

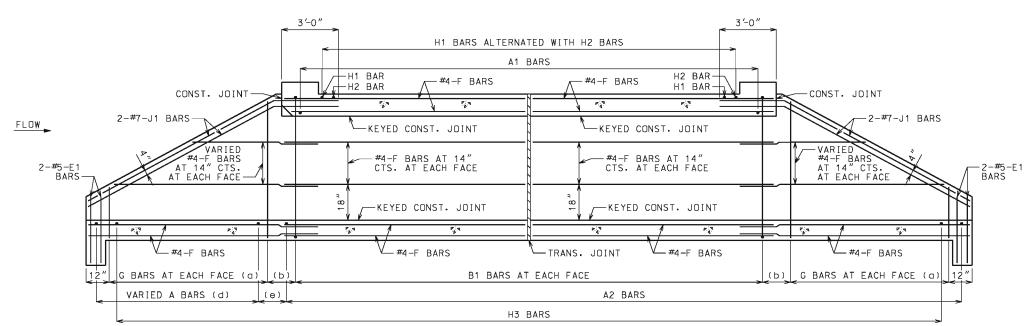
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 5/13/2015 703.81H

SHEET NO.





## SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 \frac{1}{2}".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) NOT SPECIFIED ON THIS SHEET
- (g) NOT SPECIFIED ON THIS SHEET
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR & CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### **CONCRETE** TRIPLE BOX CULVERT

SKEW: SQUARED WINGS: FLARED

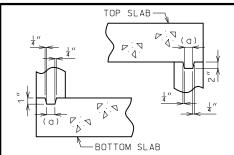
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 5/13/2015

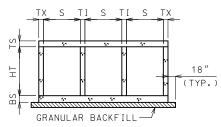
703.81H

SHEET NO. 2 OF 3

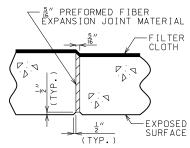


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL



GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



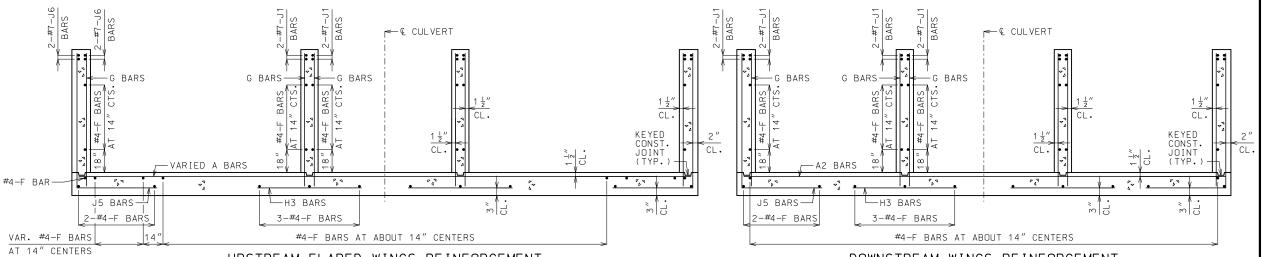
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

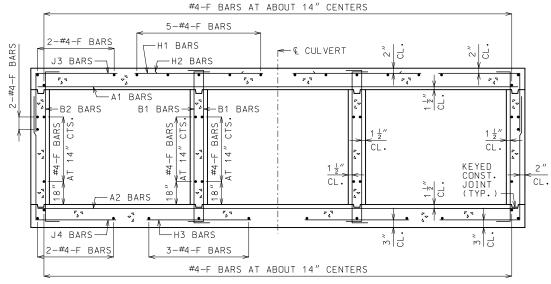
REINFORCEMENT

NEAR INTERIOR WALL

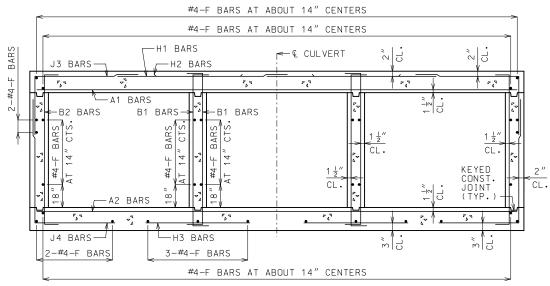


UPSTREAM FLARED WINGS REINFORCEMENT

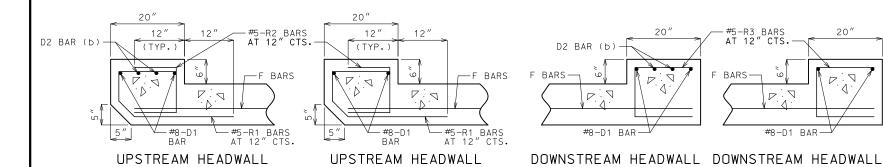




BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



REINFORCEMENT

NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0' #9 FOR CLEAR SPAN > 13'-0'

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF © WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

REINFORCEMENT

NEAR MIDSPAN

REINFORCEMENT

NEAR INTERIOR WALL

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

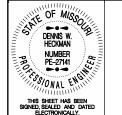
DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## TRIPLE BOX CULVERT

CONCRETE

SKEW: SQUARED WINGS: FLARED

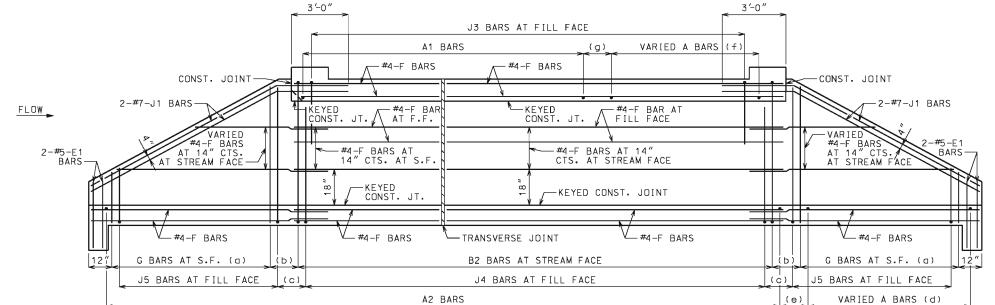
SECTIONS

DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

703.81H

SHEET NO. 3 OF 3

#### J5 BARS AT BOTTOM J4 BARS AT BOTTOM J5 BARS AT BOTTOM (c) (c) -4-#5-E1 BARS (SIMILAR AT ENDS G BARS (a) B2 BARS AT BOTTOM G BARS (a) ALL WALLS) VARIED 2-#4-F BARS AT BOTTOM <u>+</u>|-₩ ₽₩ CUT SECTION LENGTHS UP TO 60 FEET H3 BARS AT BOTTOM /ARIED 3-BARS AT E 뉘區 CTS. -#4 AT B1 BAR PAIRS AT BOTTOM G BAR PAIRS (a) (b) G BAR PAIRS (a) 12" (b) - & CULVERT FLOW H3 BARS AT BOTTOM -#4-BOT /ARIED 3-BARS AT E BOT G BAR PAIRS (a) B1 BAR PAIRS AT BOTTOM G BAR PAIRS (a) VARIED 2-#4-F VARIED 2-#4-F BARS AT BOTTOM TRANSVERSE JOINT G BARS (a) B2 BARS AT BOTTOM G BARS (a) (c) J5 BARS AT BOTTOM J4 BARS AT BOTTOM J5 BARS AT BOTTOM (c) VARIED A BARS AT TOP (d) A2 BARS AT TOP (e) VARIED A BARS AT TOP (d) PLAN OF BOTTOM SLAB 3′-0″ 3'-0" J3 BARS AT FILL FACE A1 BARS VARIED A BARS (f)



ELEVATION OF EXTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT T

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

-END OF WALL (TYP.) (NOT SHOWN)

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 \frac{1}{2}".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



#### CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: STRAIGHT

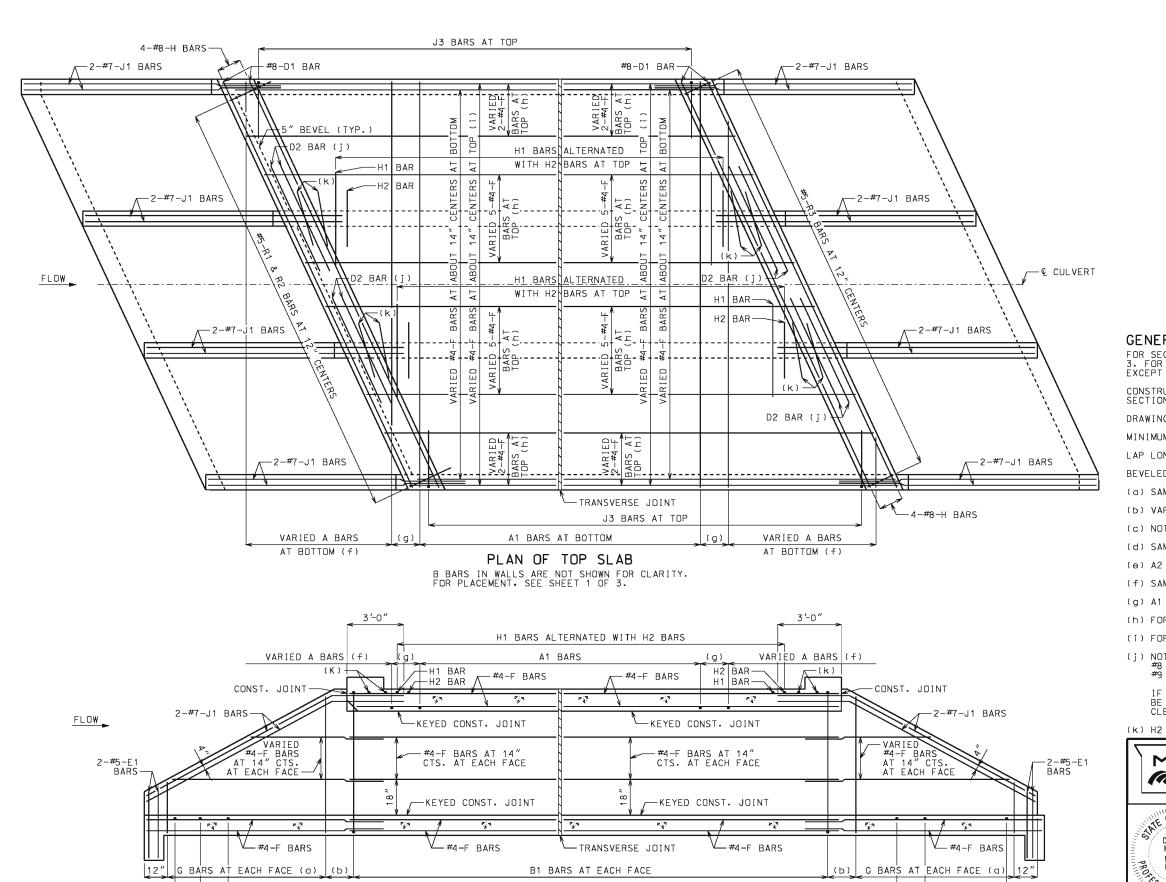
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 5/13/2015

703.82H

SHEET NO. 1 OF 3



## SECTION NEAR INTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

A2 BARS

H3 BARS

VARIED A BARS (d)

### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR \$\frac{1}{4}\$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



VARIED A BARS (d)

## CONCRETE TRIPLE BOX CULVERT

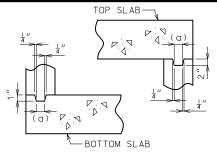
SKEW: LEFT ADVANCE WINGS: STRAIGHT

REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

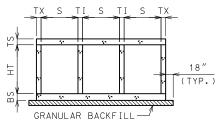
: <u>12/01/2011</u> : 5/13/2015 703.82H

SHEET NO.

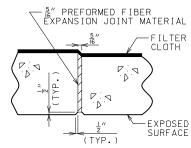


### KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL



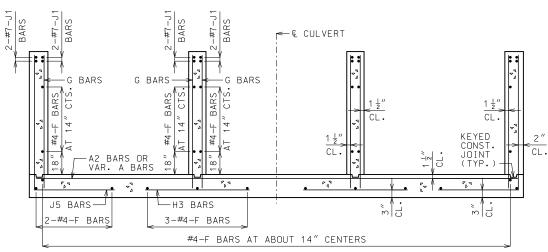
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



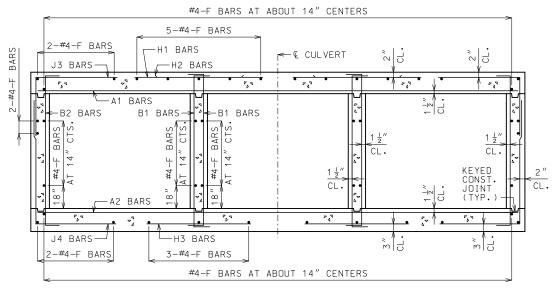
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

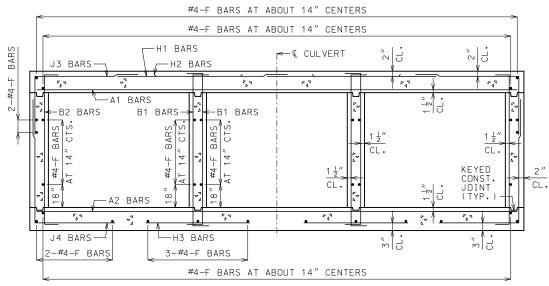
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



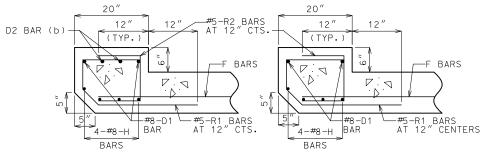
UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"

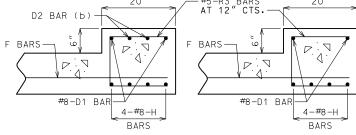


BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN



DOWNSTREAM HEADWALL DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

REINFORCEMENT NEAR MIDSPAN

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1  $\frac{1}{2}^{\prime\prime}$  .

HEADWALL.

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE

NORMAL TO LONG DIRECTION OF

DRAWING NOT TO SCALE. FOLLOW

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: STRAIGHT

SECTIONS

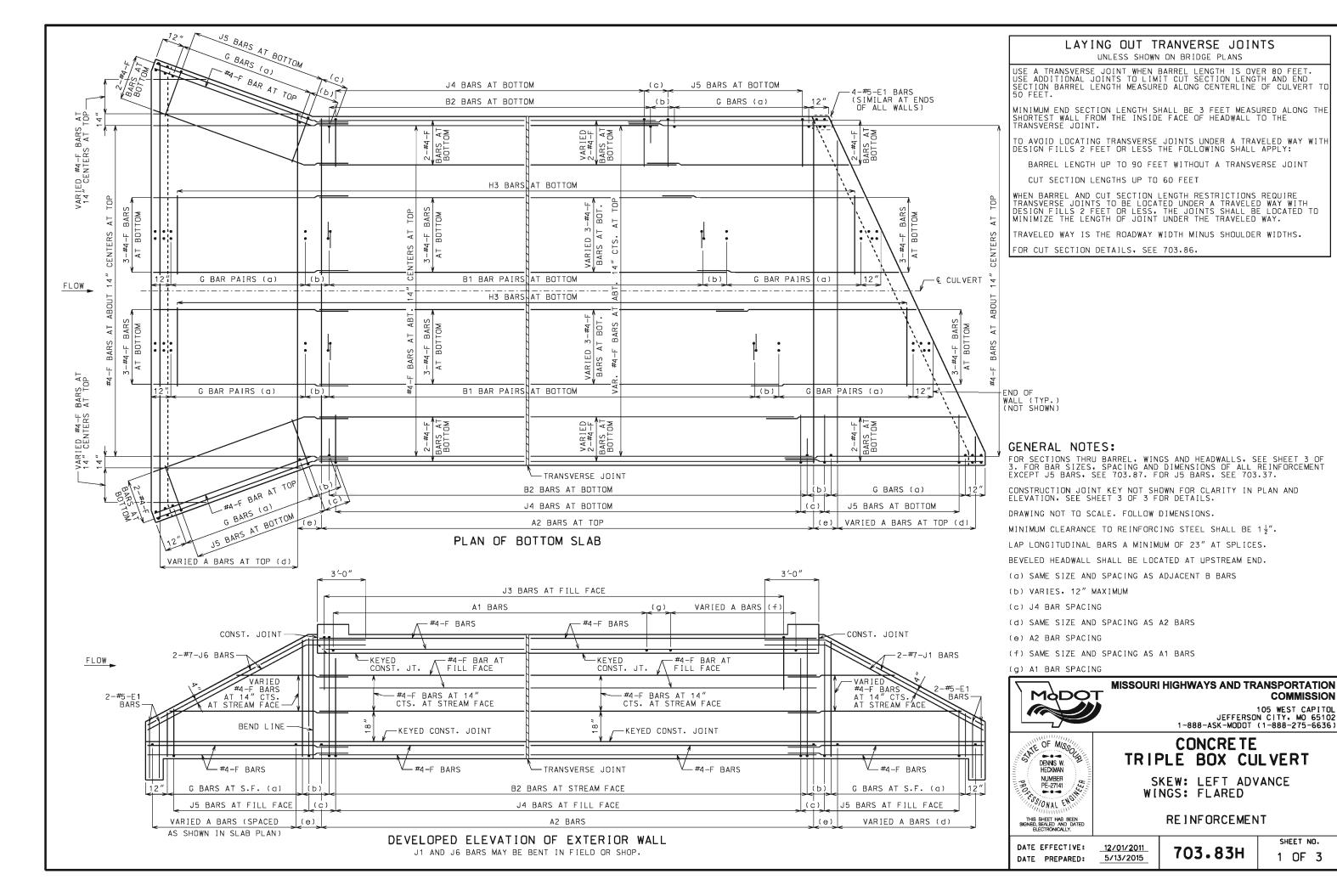
DATE EFFECTIVE: DATE PREPARED:

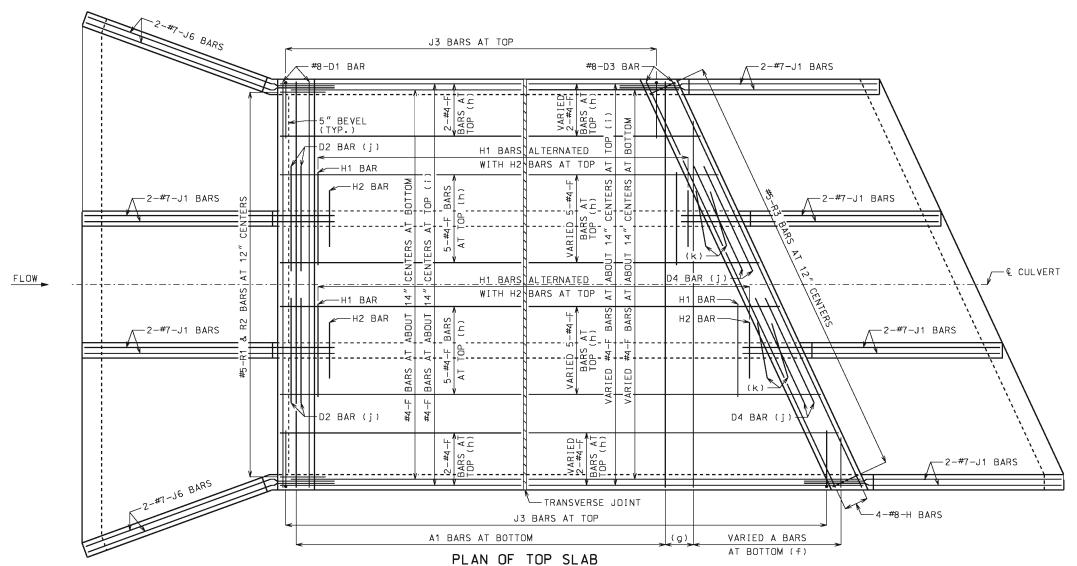
01/01/2021 10/14/2020 703.82H

SHEET NO. 3 OF 3

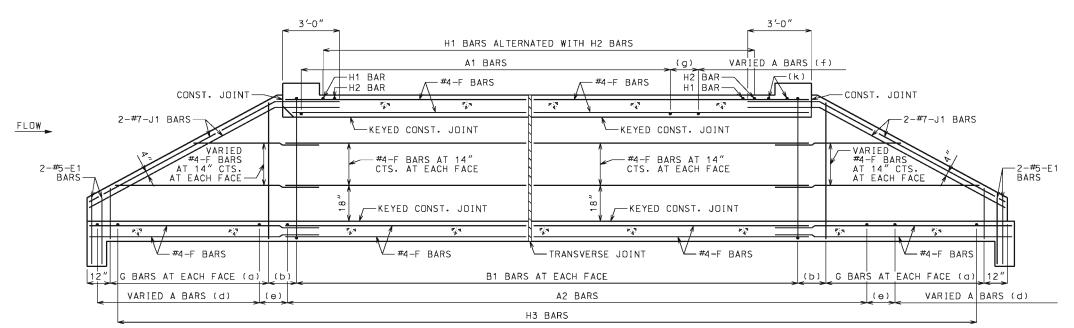
(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF D2 BARS ARE REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.





B BARS IN WALLS ARE NOT SHOWN FOR CLARITY, FOR PLACEMENT, SEE SHEET 1 OF 3.



## SECTION NEAR INTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES. SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0" #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR \$\frac{1}{4}\$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

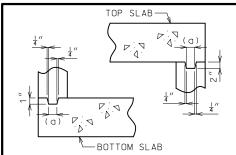
SKEW: LEFT ADVANCE WINGS: FLARED

REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 12/01/2011 5/13/2015 **70**3

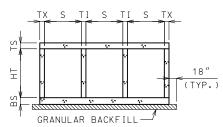
703.83H

SHEET NO.

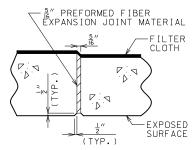


## KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL



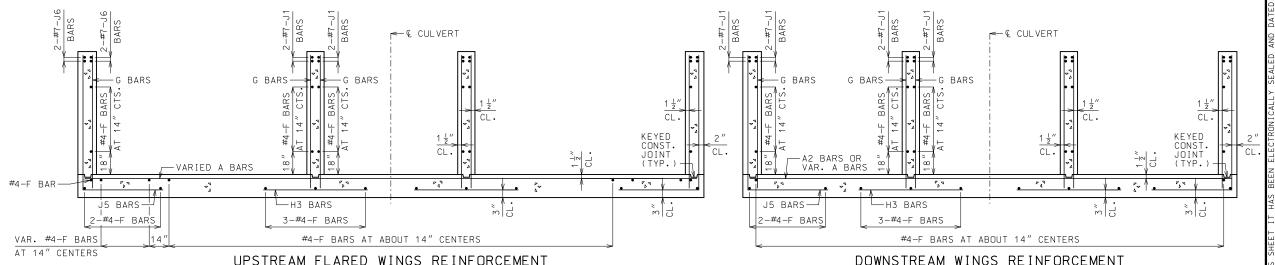
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS

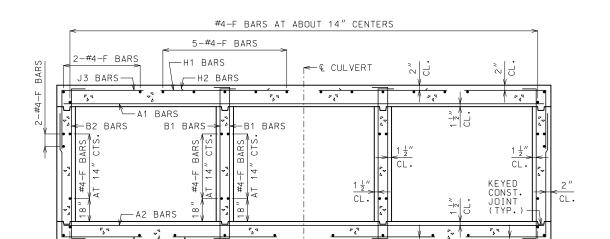


#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



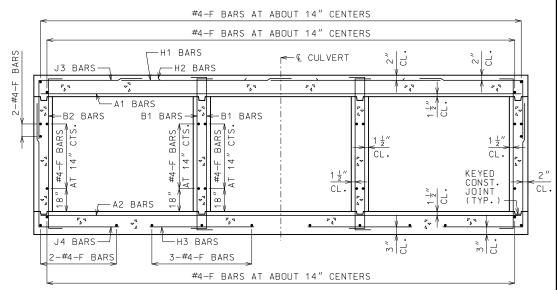


BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"

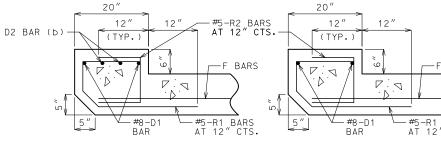
#4-F BARS AT ABOUT 14" CENTERS

-H3 BARS

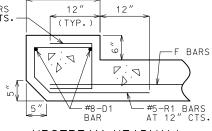
3-#4-F BARS



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



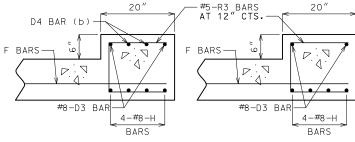
UPSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL



J4 BARS

2-#4-F BARS

UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN



DOWNSTREAM HEADWALL DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

REINFORCEMENT NEAR MIDSPAN

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF © WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

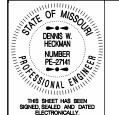
DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE WINGS: FLARED

SECTIONS

DATE EFFECTIVE: DATE PREPARED: 703.83H

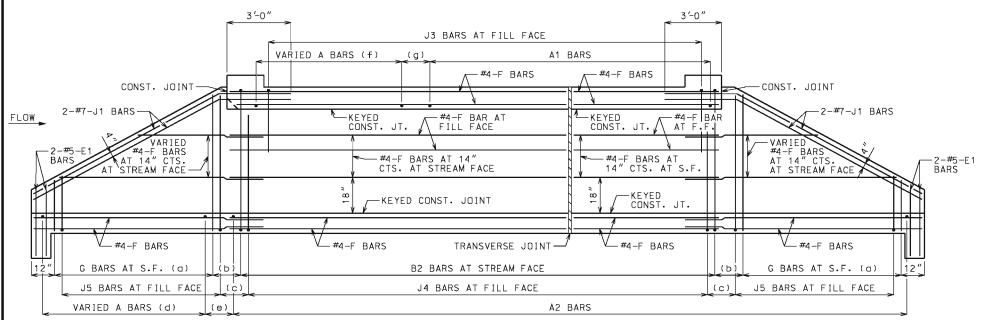
SHEET NO.

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0" #8 FOR CLEAR SPAN > 10'-0' #9 FOR CLEAR SPAN > 13'-0'

01/01/2021

3 OF 3

#### J5 BARS AT BOTTOM J4 BARS AT BOTTOM J5 BARS AT BOTTOM (c) (c) G BARS (a) B2 BARS AT BOTTOM (Ь G BARS (a) VARIED 2-#4-F BARS AT BOTTOM VARIED 2-#4-F 3ARS AT BOTTOM ₽₽ H3 BARS AT BOTTOM /ARIED 3-BARS AT E CTS. G BAR PAIRS (a) (b) B1 BAR PAIRS AT BOTTOM G BAR PAIRS (a) (b) FLOW H3 BARS AT BOTTOM CUL VERT -#4-BOT G BAR PAIRS (a) G BAR PAIRS (a) B1 BAR PAIRS AT BOTTOM (b) WALL (TYP.) (NOT SHOWN) VARIED 2-#4-F BARS AT BOTTOM VARIED 2-#4-F BARS AT BOTTOM PA, -4-#5-E1 BARS (SIMILAR AT ENDS OF ALL WALLS) TRANSVERSE JOINT G BARS (a) B2 BARS AT BOTTOM G BARS (a) J5 BARS AT BOTTOM (6) J4 BARS AT BOTTOM J5 BARS AT BOTTOM VARIED A BARS AT TOP (d) A2 BARS AT TOP (e) VARIED A BARS AT TOP (d) PLAN OF BOTTOM SLAB 3′-0″ 3′-0″ J3 BARS AT FILL FACE VARIED A BARS (f) -#4-F BARS -#4-F BARS CONST. JOINT -CONST. JOINT



## ELEVATION OF EXTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT T 50 FFFT.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 ½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) J4 BAR SPACING
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

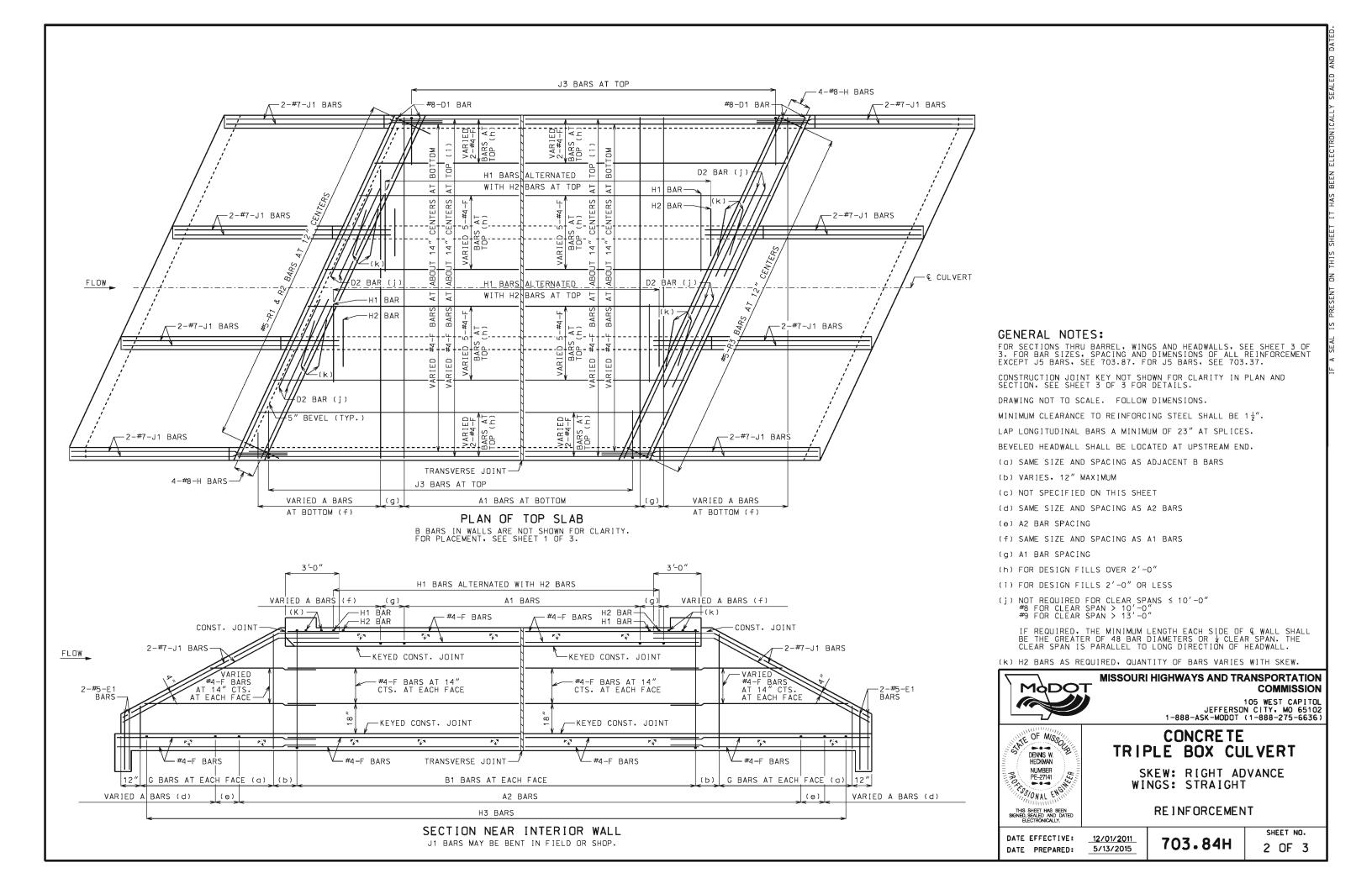
SKEW: RIGHT ADVANCE WINGS: STRAIGHT

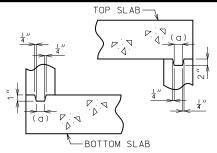
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: <u>12/01/2011</u> 5/13/2015 **70** 

703.84H

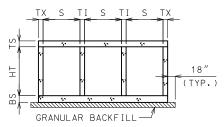
SHEET NO.



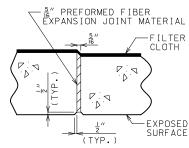


#### KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL



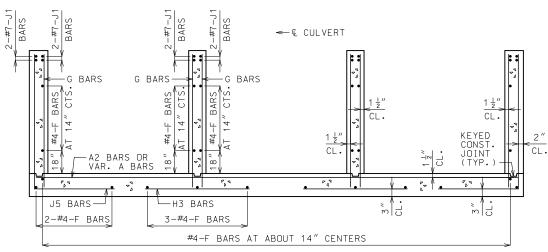
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



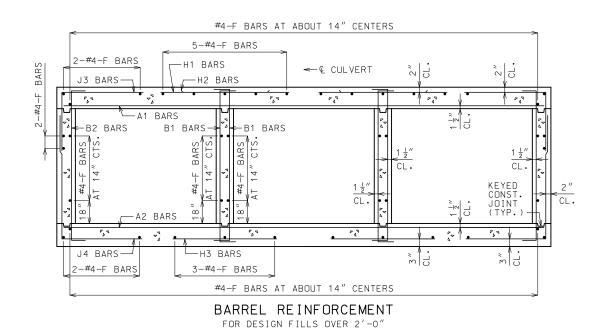
#### TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH
MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SEPARATION GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



-B2 BARS B1 BARS -B1 BARS CL. KEYED CONST JOINT (TYP. CL -A2 BARS J4 BARS -H3 BARS 2-#4-F BARS 3-#4-F BARS #4-F BARS AT ABOUT 14" CENTERS

#4-F BARS AT ABOUT 14" CENTERS

#4-F BARS AT ABOUT 14" CENTERS

← © CULVERT

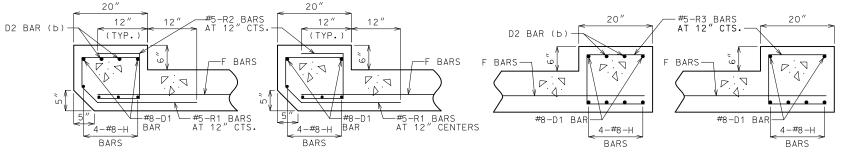
P 9

-H1 BARS

— A1 BARS

-H2 BARS

BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



#### UPSTREAM HEADWALL REINFORCEMENT

NEAR INTERIOR WALL

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0' #9 FOR CLEAR SPAN > 13'-0'

#### UPSTREAM HEADWALL REINFORCEMENT NEAR MIDSPAN

#### DOWNSTREAM HEADWALL DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

REINFORCEMENT NEAR MIDSPAN

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF © WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

J3 BARS

7,9

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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2″.

P 9



### CONCRETE TRIPLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: STRAIGHT

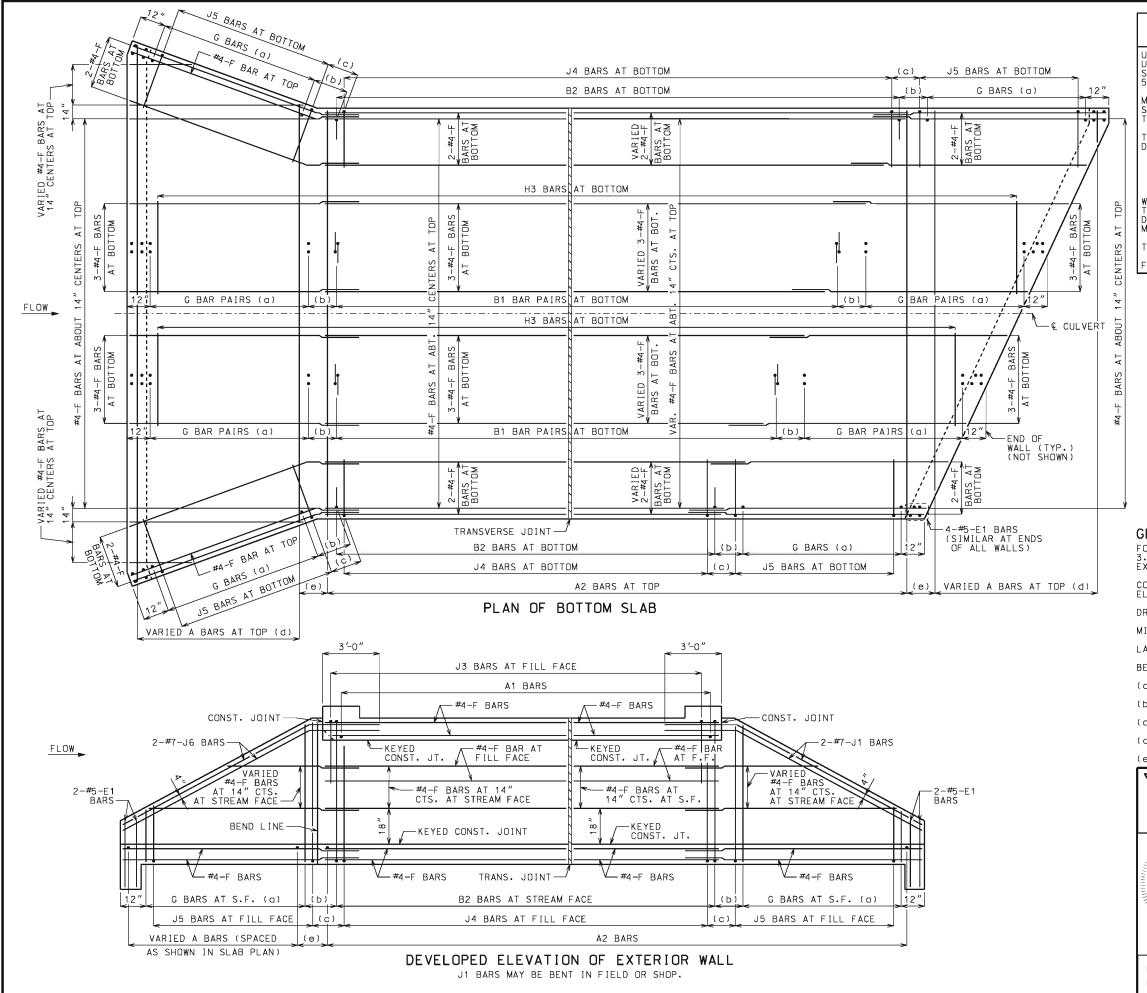
SECTIONS

DATE EFFECTIVE: DATE PREPARED:

01/01/2021

703.84H

SHEET NO. 3 OF 3



#### LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT T 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

#### **GENERAL NOTES:**

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE, FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



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## CONCRETE TRIPLE BOX CULVERT

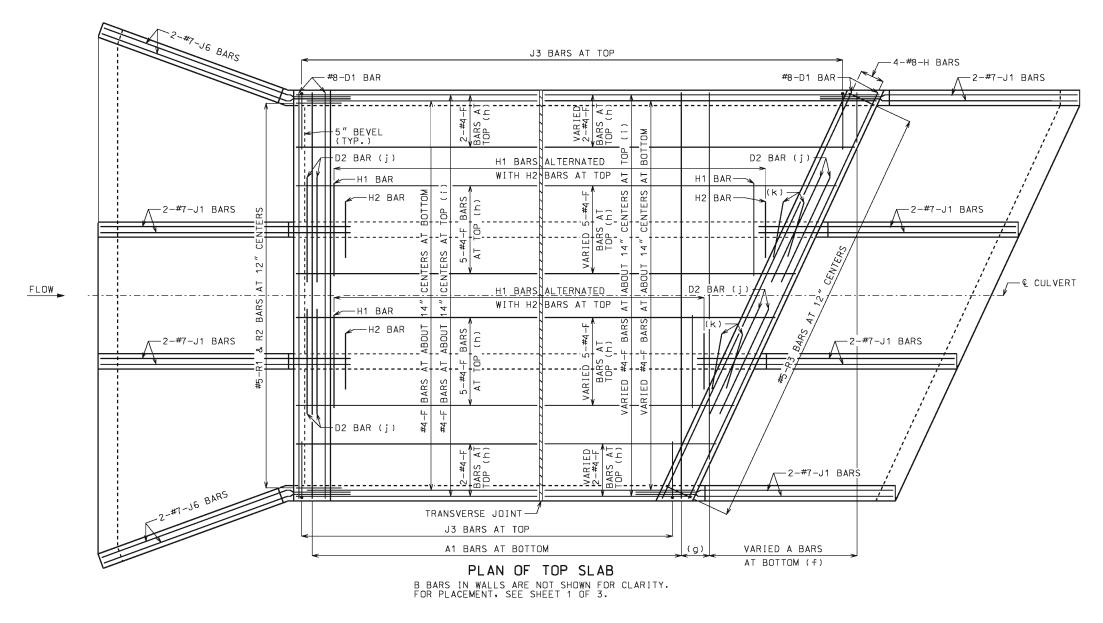
SKEW: RIGHT ADVANCE WINGS: FLARED

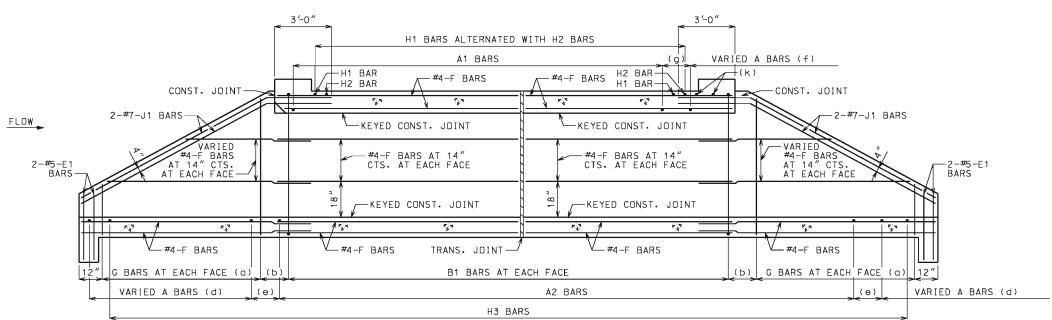
REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 5/13/2015 703.85C

SHEET NO.





## SECTION NEAR INTERIOR WALL J1 BARS MAY BE BENT IN FIELD OR SHOP.

#### GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

- (a) SAME SIZE AND SPACING AS ADJACENT B BARS
- (b) VARIES, 12" MAXIMUM
- (c) NOT SPECIFIED ON THIS SHEET
- (d) SAME SIZE AND SPACING AS A2 BARS
- (e) A2 BAR SPACING
- (f) SAME SIZE AND SPACING AS A1 BARS
- (g) A1 BAR SPACING
- (h) FOR DESIGN FILLS OVER 2'-0"
- (i) FOR DESIGN FILLS 2'-0" OR LESS
- (j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"
  #8 FOR CLEAR SPAN > 10'-0"
  #9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED. THE MINIMUM LENGTH EACH SIDE OF & WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR \$\frac{1}{4}\$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# CONCRETE TRIPLE BOX CULVERT

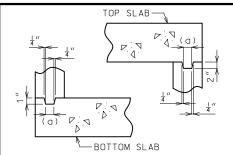
SKEW: RIGHT ADVANCE WINGS: FLARED

REINFORCEMENT

DATE EFFECTIVE: DATE PREPARED: 12/01/2011 5/13/2015 **7** 

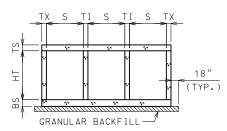
703.85C

SHEET NO.

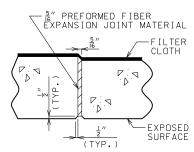


KEYED CONSTRUCTION JOINT

(a) APPROXIMATELY ONE-THIRD OF WALL



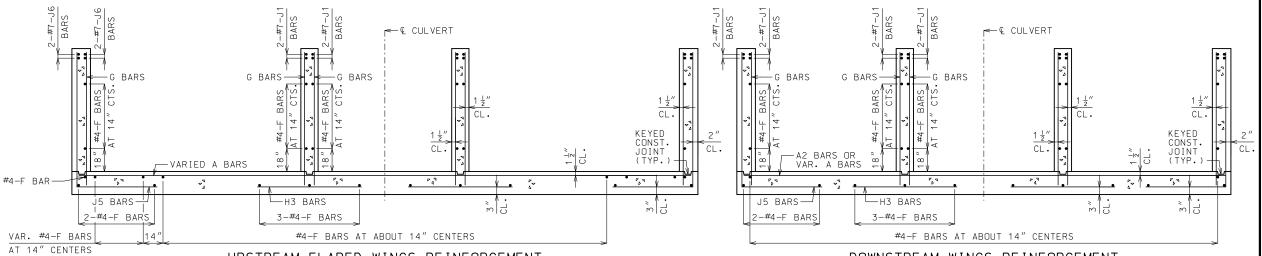
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



#### TRANSVERSE JOINT THRU BARREL

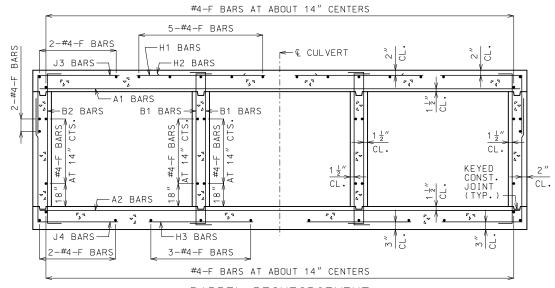
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE
THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS
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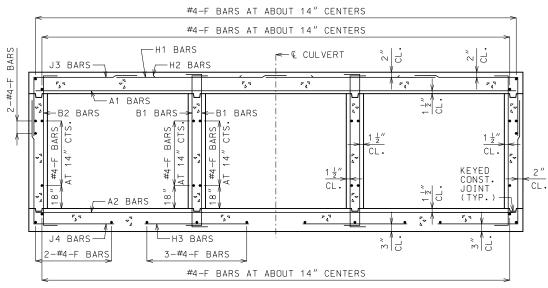


UPSTREAM FLARED WINGS REINFORCEMENT

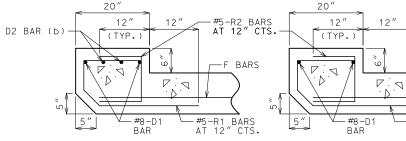
DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



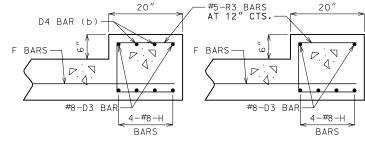
BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS



#5-R1 BARS AT 12" CTS. UPSTREAM HEADWALL UPSTREAM HEADWALL REINFORCEMENT REINFORCEMENT NEAR INTERIOR WALL NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

#8 FOR CLEAR SPAN > 10'-0' #9 FOR CLEAR SPAN > 13'-0'



DOWNSTREAM HEADWALL DOWNSTREAM HEADWALL REINFORCEMENT NEAR INTERIOR WALL

REINFORCEMENT NEAR MIDSPAN

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF © WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR ¼ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

─F BARS

#### GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO © CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE  $1\frac{1}{2}$ ".



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

SKEW: RIGHT ADVANCE WINGS: FLARED

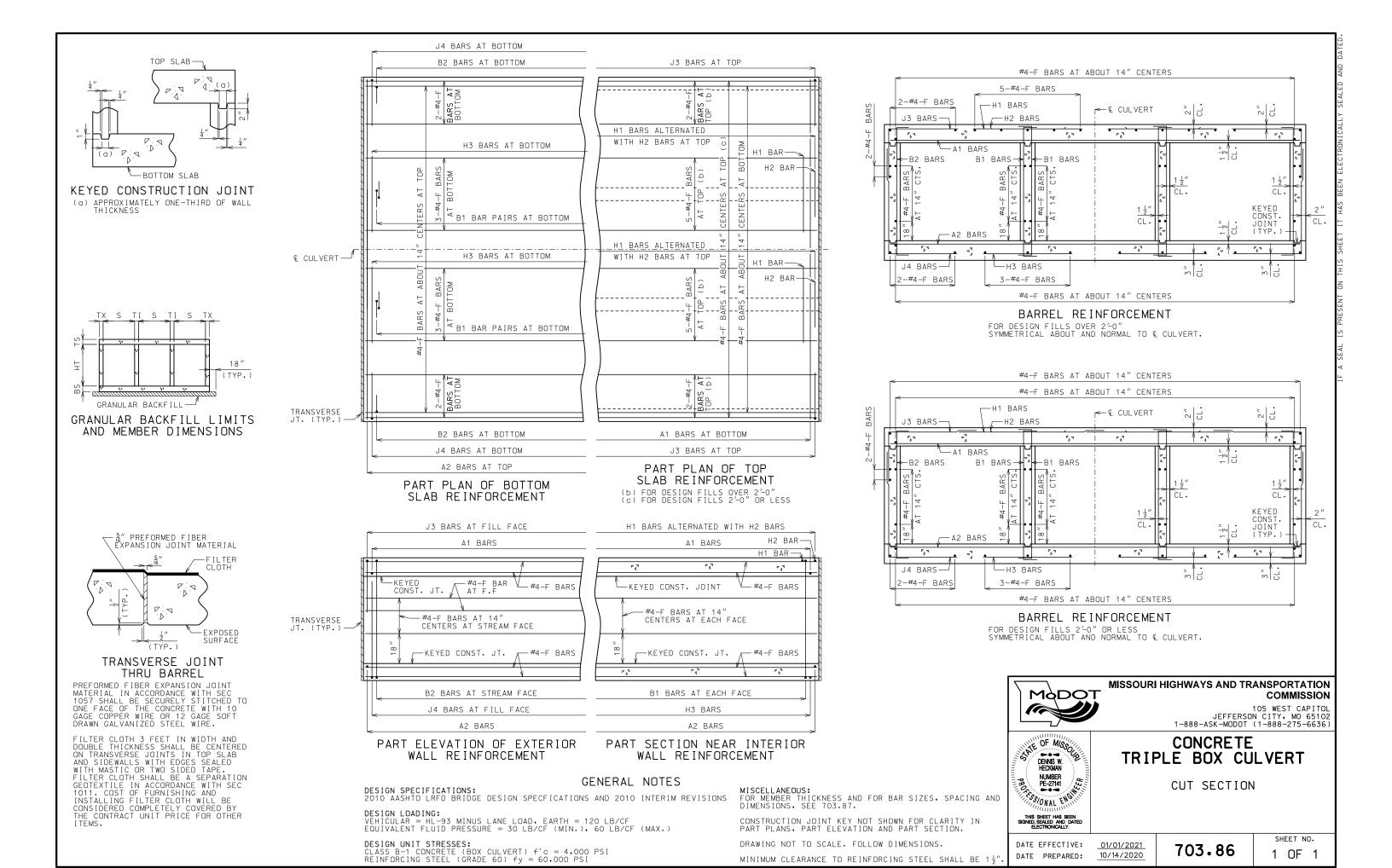
SECTIONS

DATE EFFECTIVE: DATE PREPARED:

01/01/2021

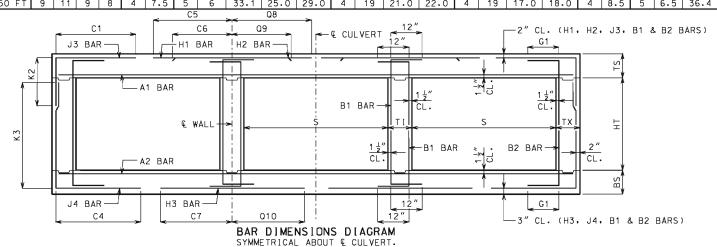
703.85C

SHEET NO. 3 OF 3



											SPAN	1 (5	) =	3 FT			HEI	GHT (	HT) =	2	FT OF	₹ 3	FT (	OR 4	FT										
		MEMBI									TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						₩AL	L BAI	₹S
DESIGN	Т	HICKN	ESS	A1	BARS			J:	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				H3	BARS		В1	BARS	B2	BARS
FILL	TS	BS .	тх ті	SIZE	SPA.	SIZE	E SPA.	C1	HT=2'	K2   HT=3'	HT=4′	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=2'	K3 HT=3'	HT=4'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	10	8	8 8	4	8.5	4	10.5	26.8	26.0	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	12	36.0	28	40	52	4	12	25.0	25.0	5	12	5	12 12
2 FT	10	8	8 8	4	8.5	4	10.5	26.8	26.0	26.0	26.0	4	24	39.5	30.5	4	24	20.0	20.0	4	12	4	12	35.0	28	40	52	4	12	24.0	24.0	5	12	5	12 12
4 FT	8	8	8 8	4	12	4	12	26.8	24.0	24.0	24.0	4	24	39.5	34.0	4	24	19.0	19.0	4	12	4	12	31.1	28	40	52	4	12	23.0	24.0	5	12	5	12 12
6 FT	8	8	8 8	4	12	4	12	31.1	24.0	24.0	24.0	4	24	26.0	26.0	4	24	18.0	18.0	4	12	4	12	28.9	28	40	52	4	12	22.0	23.0	5	12	5	12 12
8 FT	8	8	8 8	4	12	4	12	28.5	24.0	24.0	24.0	4	24	24.0	24.0	4	24	18.0	18.0	4	12	4	12	27.3	28	40	52	4	12	22.0	23.0	5	12	5	12 0
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												SPA	N (S	5) = 3	3 FT			HEIG	HT (F	HT)	= 5	FT (	OR 6	FT										
		MEM										TOP :	SLAB	BARS										E	воттом	SLAB E	BARS					WAL	L BAI	RS
DESIGN		THIC	(NES	S	A1	BARS			J3	3 BARS			H1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1	BARS	B2	BARS
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1		(2   HT=6'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=5'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.
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4 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	34.0	4	24	19.0	19.0	4	12	4	10	36.0	64	76	4	12	34.0	24.0	5	12	5	12
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8 FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	24.0	4	24	18.0	18.0	4	12	4	9	36.0	64	76	4	12	24.0	23.0	5	12	5	12
IO FT	8	8	8	8	4	12	4	12	26.8	24.0	24.0	4	24	39.5	23.0	4	24	18.0	18.0	4	12	4	8.5	36.0	64	76	4	12	23.0	23.0	5	12	5	12
12 FT	8	8	8	8	4	12	4	12	34.9	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	9	34.4	64	76	4	12	22.0	23.0	5	12	5	12
4 FT	8	8	8	8	4	12	4	11	34.5	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	8.5	34.1	64	76	4	12	22.0	23.0	5	12	5	12
6 FT	8	8	8	8	4	12	4	10	34.3	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	8	33.9	64	76	4	12	22.0	23.0	5	12	5	12
8 FT	8	8	8	8	4	12	4	9	34.0	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	7.5	33.8	64	76	4	12	22.0	23.0	5	12	5	12
20 FT	8	8	8	8	4	12	4	8	33.8	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	7	33.6	64	76	4	11.5	22.0	23.0	5	12	5	12
22 FT	8	8	8	8	4	12	4	7.5	33.6	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	12	4	6.5	33.5	64	76	4	10.5	22.0	23.0	5	12	5	12
24 FT	8	8	8	8	4	12	4	7	33.5	24.0	24.0	4	24	22.0	22.0	4	24	17.0	18.0	4	11.5	4	6	33.4	64	76	4	10.5	22.0	23.0	5	12	5	12
26 FT	8	8	8	8	4	12	4	6.5	33.4	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	10.5	5	6.5	33.3	64	76	4	10	22.0	22.0	5	12	5	12
28 FT	8	8	8	8	4	12	4	6	33.3	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	10	5	6	33.1	64	76	4	9.5	22.0	22.0	5	12	5	12
30 FT	8	8	9	8	4	11.5	4	6.5	32.3	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	9.5	4	6	32.1	64	76	4	9	22.0	23.0	5	12	5	12
32 FT	8	9	9	8	4	11	4	6.5	32.1	24.0	24.0	4	24	21.0	22.0	4	24	17.0	18.0	4	10	4	6.5	34.1	65	77	4	10.5	22.0	23.0	5	12	5	12
34 FT	8	9	ው	8	4	10	4	6	32.0	24.0	24.0	4	23	21.0	22.0	4	23	17.0	18.0	4	9.5	4	6	34.0	65	77	4	10	22.0	23.0	5	12	5	11.5
36 FT	8	9	თ	8	4	9.5	5	7	32.0	24.0	24.0	4	22	21.0	22.0	4	22	17.0	18.0	4	9	4	6	34.0	65	77	4	10	22.0	23.0	5	12	5	11
38 FT	8	9	9	8	4	9	5	6.5	32.0	24.0	28.0	4	21	21.0	22.0	4	21	17.0	18.0	4	8.5	5	7	34.0	65	77	4	9.5	22.0	23.0	5	12	5	10
O FT	8	10	9	8	4	8.5	5	6	31.9	24.0	24.0	4	20	21.0	22.0	4	20	17.0	18.0	4	9	4	6	35.5	66	78	4	10.5	23.0	23.0	5	12	5	10
42 FT	9	10	9	8	4	9.5	5	6.5	33.4	25.0	29.0	4	22	21.0	22.0	4	22	17.0	18.0	4	9	5	7	35.3	66	78	4	10	23.0	23.0	5	12	5	9.5
14 FT	9	10	9	8	4	9	5	6.5	33.3	25.0	29.0	4	21	21.0	22.0	4	21	17.0	18.0	4	8.5	5	6.5	35.3	66	78	4	10	23.0	23.0	5	12	5	9
46 FT	9	10	9	8	4	8.5	5	6	33.3	25.0	29.0	4	21	21.0	22.0	4	21	17.0	18.0	4	8	5	6.5	35.1	66	78	4	9.5	23.0	23.0	5	12	5	8.5
48 FT	9	11	9	8	4	8	5	6	33.1	25.0	29.0	4	20	21.0	22.0	4	20	17.0	18.0	4	8.5	5	6.5	36.4	67	79	4	10	23.0	23.0	5	12	5	8.5
50 FT	9	11	9	8	4	7.5	5	6	33.1	25.0	29.0	4	19	21.0	22.0	4	19	17.0	18.0	4	8.5	5	6.5	36.4	67	79	4	10	23.0	23.0	5	12	5	8.5



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 3 FEET
THIS SEET HAS BEEN
SIGNED, SCALED AND DATED
ELECTRONICALLY.
HE [GHT (HT): 2 THRU 6 FEET

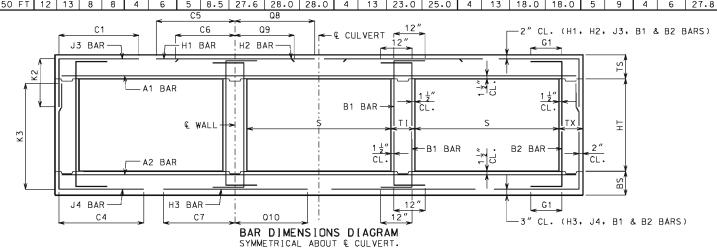
DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

37 | SHEET NO. 1 OF 27

												SPA		•	1 FT			HEIG	HT (F	IT)	= 2	FT (	OR 3	FT										
	_	MEM		_								TOP	SLAB												MOTTOM	SLAB E	BARS					WAL		
DESIGN		THICK	(NES	S	A1	BARS			J3	BARS			H1	BARS		<u> </u>	H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 [	BARS	B2	BARS
FILL	TS	BS	ΤX	ΤI	S I ZE	SPA.	SIZE	SPA.	C1	HT=2'	(2   HT=3'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=2'	3 HT=3'	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G1
1 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	29.4	28	40	4	12	27.0	28.0	5	12	5	12 12
2 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	20.0	4	12	4	12	27.3	28	40	4	11.5	27.0	27.0	5	12	5	12 12
4 FT	8	8	8	8	4	12	4	12	28.6	24.0	24.0	4	24	33.0	36.0	4	24	20.0	20.0	4	12	4	12	25.0	28	40	4	11.5	26.0	27.0	5	12	5	12 12
6 FT	8	8	8	8	4	12	4	12	26.0	24.0	24.0	4	24	28.0	29.0	4	24	19.0	19.0	4	12	4	12	24.1	28	40	4	10.5	25.0	26.0	5	12	5	12 12
8 FT	8	8	8	8	4	12	4	12	24.8	24.0	24.0	4	24	26.0	28.0	4	24	19.0	19.0	4	12	4	12	23.5	28	40	4	10	25.0	26.0	5	12	5	12 0
10 FT	8	8	8	8	4	12	4	12	24.1	24.0	24.0	4	24	26.0	27.0	4	24	19.0	19.0	4	12	4	12	23.1	28	40	4	9	25.0	26.0	5	12	5	12 0
12 FT	8	8	8	8	4	12	4	12	23.6	24.0	24.0	4	23	25.0	26.0	4	23	18.0	19.0	4	12	4	12	22.9	28	40	4	8	25.0	26.0	5	12	5	12 0
14 FT	8	8	8	8	4	12	4	12	23.4	24.0	24.0	4	22	25.0	26.0	4	22	18.0	18.0	4	11	4	12	22.6	28	40	4	7.5	24.0	26.0	5	12	5	12 0
16 FT	8	8	8	8	4	12	4	12	22.5	24.0	24.0	4	21	24.0	25.0	4	21	18.0	18.0	4	10.5	4	12	22.1	28	40	4	7.5	24.0	25.0	5	12	5	12 0
18 FT	8	8	8	8	4	11.5	4	12	22.5	24.0	24.0	4	20	24.0	25.0	4	20	18.0	18.0	4	9.5	4	10.5	22.1	28	40	4	7	24.0	25.0	5	12	5	12 0
20 FT	8	8	8	8	4	10.5	4	11	22.4	24.0	24.0	4	18	24.0	25.0	4	18	18.0	18.0	4	8.5	4	9.5	22.1	28	40	4	6.5	24.0	25.0	5	12	5	12 0
22 FT	8	8	8	8	4	9.5	4	10	22.4	24.0	24.0	4	17	24.0	25.0	4	17	18.0	18.0	4	7.5	4	9	22.0	28	40	4	6	24.0	25.0	5	12	5	12 0
24 FT	8	9	8	8	4	8.5	4	9	22.6	24.0	24.0	4	15	24.0	25.0	4	15	18.0	18.0	4	8	4	11.5	21.4	29	41	4	7	24.0	26.0	5	12	5	12 0
26 FT	8	9	8	8	4	8	4	8.5	22.5	24.0	24.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7	4	11	21.4	29	41	4	6.5	24.0	26.0	5	12	5	12 0
28 FT	8	10	8	8	4	7.5	4	8	22.8	24.0	24.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7.5	4	12	20.9	30	42	4	7	24.0	26.0	5	12	5	12 0
30 FT	9	10	8	8	4	7.5	4	10	22.1	25.0	25.0	4	15	24.0	26.0	4	15	18.0	18.0	4	7	4	12	21.0	30	42	4	7	24.0	26.0	5	12	5	12 0
32 FT	9	10	8	8	4	7	4	9.5	22.1	25.0	25.0	4	14	24.0	26.0	4	14	18.0	18.0	4	6	4	12	21.0	30	42	4	6	24.0	26.0	5	12	5	12 0
34 FT	9	11	8	8	4	6.5	4	9	22.3	25.0	25.0	4	13	24.0	26.0	4	13	18.0	18.0	4	6.5	4	10.5	20.6	31	43	4	7	24.0	26.0	5	12	5	12 0
36 FT	10	11	8	8	4	7	4	10	21.9	26.0	26.0	4	14	24.0	26.0	4	14	18.0	19.0	4	6.5	4	10.5	20.9	31	43	4	7	24.0	26.0	5	12	5	12 0
38 FT	10	12	8	8	4	6.5	4	9.5	22.0	26.0	26.0	4	13	24.0	26.0	4	13	18.0	19.0	4	6.5	4	9.5	20.5	32	44	4	7.5	24.0	27.0	5	12	5	12 0
40 FT	10	12	8	8	4	6	4	9	22.0	26.0	26.0	4	13	24.0	26.0	4	13	18.0	19.0	4	6.5	4	9.5	20.5	32	44	4	7	24.0	27.0	5	12	5	12 0
42 FT	11	12	8	8	4	6.5	4	9.5	21.6	27.0	27.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6	4	9.5	20.8	32	44	4	6.5	24.0	26.0	5	12	5	12 0
44 FT	11	12	8	8	4	6	4	9.5	21.6	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	9.5	20.8	32	44	4	6	24.0	26.0	5	12	5	12 0
46 FT	11	13	8	8	4	6	4	8.5	21.8	27.0	27.0	4	12	23.0	26.0	4	12	18.0	19.0	4	6	4	8.5	20.5	33	45	4	6.5	23.0	27.0	5	12	5	12 0
48 FT	12	13	8	8	4	6	4	8.5	21.5	28.0	28.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	8.5	20.8	33	45	4	6.5	24.0	27.0	5	12	5	12 0
50 FT	12	13	8	8	5	9	4	8.5	21.5	28.0	28.0	4	13	23.0	26.0	4	13	18.0	19.0	5	8.5	4	8.5	20.8	33	45	4	6	24.0	27.0	5	12	5	12 0

												SPA	N (S	;) = 4	4 FT			HEIG	HT (F	IT)	= 4	FT (	OR 5	FT											
		MEME										TOP	SLAB	BARS										Е	воттом	SLAB E	BARS					WAL	L BAR	(S	
DESIGN		THICK	NES:	5	A1 B	ARS			J3	BARS			H1	BARS			H2	BARS		Α2	BARS			J4	BARS			Н3	BARS		B1 E	BARS	B2	BARS	;
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		.2 НТ=5′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	K HT=4'		SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA.	G 1
1 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	12	42.0	52	64	4	12	28.0	28.0	5	12	5	12	12
2 FT	10	8	8	8	4	7	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	12	39.1	52	64	4	11	27.0	28.0	5	12	5	12	12
4 FT	8	8	8	8	4	12	4	12	30.3	24.0	24.0	4	24	47.5	37.0	4	24	20.0	20.0	4	12	4	12	34.8	52	64	4	11	26.0	27.0	5	12	5	12	1:
6 FT	8	8	8	8	4	12	4	12	34.6	24.0	24.0	4	24	29.0	30.0	4	24	19.0	19.0	4	12	4	11.5	32.1	52	64	4	10.5	25.0	26.0	5	12	5	12	1
8 FT	8	8	8	8	4	12	4	12	31.4	24.0	24.0	4	24	27.0	28.0	4	24	19.0	19.0	4	12	4	11	30.3	52	64	4	9.5	25.0	26.0	5	12	5	12	С
10 FT	8	8	8	8	4	12	4	12	29.9	24.0	24.0	4	24	26.0	27.0	4	24	19.0	19.0	4	12	4	10.5	29.3	52	64	4	9	25.0	26.0	5	12	5	12	C
12 FT	8	8	8	8	4	12	4	12	29.1	24.0	24.0	4	24	25.0	27.0	4	24	18.0	19.0	4	11.5	4	10	28.5	52	64	4	8.5	24.0	26.0	5	12	5	12	C
14 FT	8	8	8	8	4	12	4	11	28.5	24.0	24.0	4	23	25.0	26.0	4	23	18.0	19.0	4	10.5	4	9.5	28.1	52	64	4	7.5	24.0	26.0	5	12	5	12	C
16 FT	8	8	8	8	4	12	4	11	26.9	24.0	24.0	4	22	24.0	26.0	4	22	18.0	19.0	4	10	4	9.5	26.6	52	64	4	7.5	24.0	26.0	5	12	5	12	(
18 FT	8	8	8	8	4	11	4	10	26.8	24.0	24.0	4	21	24.0	26.0	4	21	18.0	19.0	4	9	4	8.5	26.5	52	64	4	7	24.0	26.0	5	12	5	12	(
20 FT	8	8	8	8	4	10	4	9	26.8	24.0	24.0	4	19	24.0	26.0	4	19	18.0	19.0	4	8	4	8	26.4	52	64	4	6.5	24.0	26.0	5	12	5	12	(
22 FT	8	8	8	8	4	9	4	8	26.6	24.0	24.0	4	17	24.0	26.0	4	17	18.0	18.0	4	7	4	7	26.4	52	64	4	6	24.0	26.0	5	12	5	12	(
24 FT	8	9	8	8	4	8.5	4	7.5	26.6	24.0	24.0	4	16	24.0	25.0	4	16	18.0	18.0	4	7.5	4	8.5	26.6	53	65	4	7	24.0	26.0	5	12	5	12	C
26 FT	8	9	8	8	4	8	4	7	26.6	24.0	24.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7	4	8	26.5	53	65	4	6.5	24.0	26.0	5	12	5	12	(
28 FT	8	10	8	8	4	7.5	4	6	26.6	24.0	24.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7.5	4	9.5	26.8	54	66	4	7.5	24.0	26.0	5	12	5	12	(
30 FT	9	10	8	8	4	7.5	4	7.5	26.9	25.0	25.0	4	15	24.0	26.0	4	15	18.0	19.0	4	7	4	9	26.9	54	66	4	7	24.0	26.0	5	12	5	12	(
32 FT	9	10	8	8	4	7	4	7	26.9	25.0	25.0	4	14	24.0	26.0	4	14	18.0	19.0	4	6	4	8	26.8	54	66	4	6	24.0	26.0	5	12	5	12	С
34 FT	9	11	8	8	4	6.5	4	6.5	26.9	25.0	25.0	4	13	24.0	26.0	4	13	18.0	18.0	4	6.5	4	8.5	27.0	55	67	4	7	24.0	26.0	5	12	5	12	C
36 FT	10	11	8	8	4	7	4	6.5	27.1	26.0	26.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6.5	4	8	27.1	55	67	4	7	24.0	26.0	5	12	5	12	С
38 FT	10	12	8	8	4	6.5	4	6	27.3	26.0	26.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6.5	4	8	27.4	56	68	4	7.5	24.0	26.0	5	12	5	12	С
40 FT	10	12	8	8	4	6	5	8	27.1	26.0	26.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6.5	4	7.5	27.4	56	68	4	7	24.0	26.0	5	12	5	12	С
42 FT	11	12	8	8	4	6.5	5	9	27.4	27.0	27.0	4	14	23.0	26.0	4	14	18.0	19.0	4	6	4	7	27.4	56	68	4	6.5	24.0	26.0	5	12	5	12	0
44 FT	11	12	8	8	4	6	5	8.5	27.4	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	6.5	27.4	56	68	4	6.5	24.0	26.0	5	12	5	12	C
46 FT	11	13	8	8	4	6	5	8.5	27.5	27.0	27.0	4	13	23.0	26.0	4	13	18.0	19.0	4	6	4	7	27.6	57	69	4	6.5	24.0	26.0	5	12	5	12	C
48 FT	12	13	8	8	4	6	5	8.5	27.6	28.0	28.0	4	14	23.0	25.0	4	14	18.0	18.0	4	6	4	6.5	27.8	57	69	4	6.5	24.0	26.0	5	12	5 1	11.5	С
50 FT	12	13	8	8 1	4	6	5	8.5	27.6	28.0	28.0	4	1.3	23.0	25.0	<b>I</b> 4	13	18.0	18.0	5	9	4	6	27.8	57	69	4	161	24.0	26.0	I 5 I	12	5	11	Ω



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET HE[GHT (HT): 2 THRU 5 FEET

DATE EFFECTIVE: DATE PREPARED:

9/29/2011

703.87

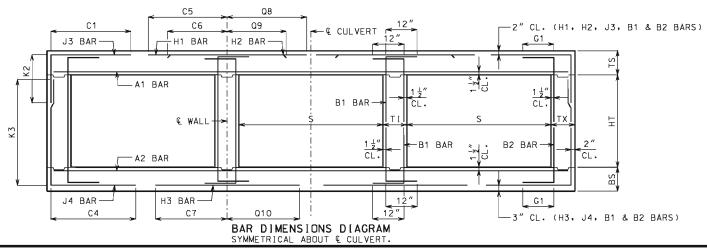
2 OF 27

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

12/01/2011

SHEET NO.

												SP/	NI (S	;) = 4	FT			HEIG	HT (F	IT )	- 6	FT (	1P 7	ΕT											〒
		MEM	) F D										SLAB I					IIL I O	111 (1	<del>' ' '</del>		' ' '	JIV 1		воттом	SIARI	ADC				Г	WAI	L BAF	<u>-</u>	$\dashv$
DEGLOV	1	MEMI THICK		s	A 1	BARS			.13	BARS		T		BARS		Т	H2	BARS		۸2	BARS				BARS	JLAD I	JAINS	ЦЗ	BARS		B1	,,,,,		BARS	$\dashv$
DESIGN. FILL						T					:2	$\vdash$		DANS				DAILS		<del></del>						٦		1							$\dashv$
	TS	BS	ΤX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	HT=7'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	HT=7'	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G	i1
1 FT	10	8	8	8	4	6.5	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	22.0	21.0	4	12	4	9	42.0	76	88	4	11.5	40.0	28.0	5	12	5	12 1	2
2 FT	10	8	8	8	4	6.5	4	10.5	30.3	26.0	26.0	4	24	47.5	36.5	4	24	21.0	21.0	4	12	4	8.5	42.0	76	88	4	11	40.0	28.0	5	12	5	12 1	2
4 FT	8	8	8	8	4	12	4	10	30.3	24.0	24.0	4	24	47.5	37.0	4	24	20.0	20.0	4	12	4	7.5	42.0	76	88	4	11	29.0	27.0	5	12	5	12 1	2
6 FT	8	8	8	8	4	12	4	10	30.3	24.0	24.0	4	24	47.5	29.0	4	24	19.0	19.0	4	12	4	7	42.0	76	88	4	10	27.0	26.0	5	12	5	12 1	2
8 FT	8	8	8	8	4	12	4	9	30.3	24.0	24.0	4	24	47.5	28.0	4	24	19.0	19.0	4	12	4	6.5	42.0	76	88	4	9.5	26.0	26.0	5	12	5	12 C	J]
10 FT	8	8	8	8	4	12	4	8	43.1	24.0	24.0	4	24	28.0	27.0	4	24	18.0	19.0	4	12	4	6.5	40.6	76	88	4	9	25.0	26.0	5	12	5	12 C	J]
12 FT	8	8	8	8	4	12	4	7.5	40.5	24.0	24.0	4	24	27.0	26.0	4	24	18.0	19.0	4	11.5	4	6	39.1	76	88	4	8.5	25.0	26.0	5	12	5	12 C	ΣĪ
14 FT	8	8	8	8	4	12	4	6.5	39.3	24.0	24.0	4	23	26.0	26.0	4	23	18.0	19.0	4	10.5	5	6.5	38.4	76	88	4	8	25.0	26.0	5	12	5	12 C	5
16 FT	8	8	8	8	4	12	4	6.5	35.5	24.0	24.0	4	23	24.0	25.0	4	23	18.0	19.0	4	10	5	6.5	35.4	76	88	4	7.5	24.0	26.0	5	12	5	12 C	5
18 FT	8	8	8	8	4	11.5	4	6	35.3	24.0	24.0	4	21	24.0	25.0	4	21	18.0	18.0	4	9	5	6	35.1	76	88	4	7	24.0	26.0	5	12	5	12 C	5
20 FT	8	8	8	8	4	10	5	6.5	35.0	24.0	28.0	4	19	24.0	25.0	4	19	18.0	18.0	4	8	6	6.5	38.0	76	88	4	6.5	24.0	26.0	5	12	5	12 C	5
22 FT	8	9	8	8	4	9.5	5	6	34.6	24.0	28.0	4	18	24.0	25.0	4	18	18.0	18.0	4	8.5	5	6	36.1	77	89	4	8	25.0	26.0	5	12	5	11.5	5
24 FT	8	9	9	8	4	8.5	5	6.5	34.1	24.0	28.0	4	16	24.0	25.0	4	16	18.0	18.0	4	8	5	7	35.6	77	89	4	7.5	25.0	26.0	5	12	5	11.5	5
26 FT	8	9	9	8	4	8	5	6	34.0	24.0	28.0	4	15	24.0	25.0	4	15	18.0	18.0	4	7.5	5	6.5	35.5	77	89	4	7	25.0	26.0	5	12	5	11 C	5
28 FT	8	10	9	8	4	7.5	6	7.5	36.8	24.0	28.0	4	14	24.0	25.0	4	14	18.0	18.0	4	7.5	5	7	36.6	78	90	4	7.5	25.0	26.0	5	12	5	10.5	5
30 FT	9	10	9	8	4	8	5	6	35.0	25.0	29.0	4	15	24.0	25.0	4	15	18.0	18.0	4	7	5	6.5	36.4	78	90	4	7	25.0	26.0	5	12	5	10 C	5
32 FT	9	10	9	8	4	7.5	5	6	35.0	25.0	29.0	4	14	24.0	25.0	4	14	18.0	18.0	4	6.5	5	6	36.3	78	90	4	6.5	25.0	26.0	5	12	5	9.5	5
34 FT	9	11	9	8	4	7	5	6	34.9	25.0	29.0	4	13	24.0	25.0	4	13	18.0	18.0	4	7	5	6.5	37.4	79	91	4	7	25.0	26.0	5	12	5	9 (	5
36 FT	10	11	9	8	4	7	5	6.5	35.9	26.0	30.0	4	15	24.0	25.0	4	15	18.0	18.0	4	7	5	6	37.0	79	91	4	7	25.0	26.0	5	12	5	8.5 C	5
38 FT	10	11	9	8	4	7	5	6	35.8	26.0	30.0	4	14	24.0	25.0	4	14	18.0	18.0	4	6.5	6	7.5	40.0	79	91	4	6.5	25.0	26.0	5	12	5	8.5	5
40 FT	10	12	9	8	4	6.5	5	6	35.6	26.0	30.0	4	13	24.0	25.0	4	13	18.0	18.0	4	6.5	5	6	38.3	80	92	4	7	25.0	26.0	5	12	5	8.5	5
42 FT	10	12	9	8	4	6	5	6	35.6	30.0	30.0	4	12	24.0	25.0	4	12	18.0	18.0	4	6.5	6	7.5	41.1	80	92	4	6.5	25.0	26.0	5	12	5	8.5 C	5
44 FT	11	12	9	8	4	6.5	6	7.5	39.5	31.0	35.0	4	14	24.0	25.0	4	14	18.0	18.0	4	6	6	7	40.9	80	92	4	6.5	25.0	26.0	5	12	5	8.5	ΣĪ
46 FT	11	13	9	8	4	6	6	6.5	39.4	31.0	35.0	4	13	24.0	25.0	4	13	18.0	18.0	4	6.5	6	7.5	42.0	81	93	4	6.5	26.0	26.0	5	12	5	8.5 C	5
48 FT	11	13	10	8	4	6	5	6	36.3	27.0	31.0	4	13	23.0	25.0	4	13	18.0	18.0	4	6	5	6.5	38.4	81	93	4	6.5	25.0	26.0	5	12	5	8 C	5
50 FT	12	13	11	8	4	6	5	7	37.0	28.0	32.0	4	14	23.0	25.0	4	14	18.0	18.0	4	6	5	7.5	37.9	81	93	4	6	25.0	26.0	5	12	5	7.5	5



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 4 FEET HE[GHT (HT): 6 THRU 7 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

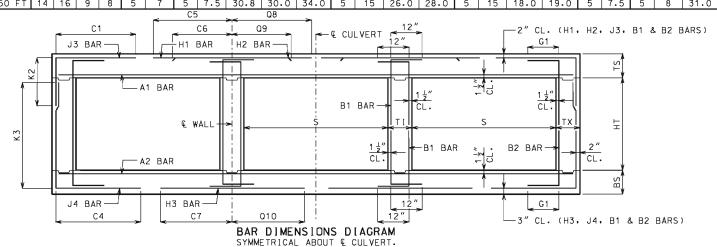
703.87

SHEET NO. 3 OF 27

	C5	Q9	2" CL. (H1, H2, J3, B1 & B2 BARS)
K3	A1 BAR	B1 BAR $\frac{1\frac{1}{2}''}{CL}$ B1 BAR $\frac{1\frac{1}{2}''}{CL}$	S
<b>.</b>	J4 BAR H3 BAR C7	O10 12"  BAR DIMENSIONS DIAGRAM	3" CL. (H3, J4, B1 & B2 BARS)

												SPA			FT			HE I G	HT (F	IT)	= 3	FT (	OR 4	FT										
		MEM		_								TOP :	SLAB												MOTTO	SLAB E	BARS					WAL		
DESIGN	ـــــــا	LHICK	NESS	S	A 1	BARS			Jā	BARS			H1	BARS		<u> </u>	H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 [	BARS	B2	BARS
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=3'	K2 HT=4'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=3'	3 HT=4'	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G1
1 FT	10	8	8	8	5	9	4	10.5	33.9	26.0	26.0	4	19	56.5	42.5	4	19	22.0	21.0	4	12	4	12	33.9	40	52	4	8.5	30.0	31.0	5	12	5	12 12
2 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	22.0	21.0	4	12	4	12	31.1	40	52	4	8.5	30.0	31.0	5	12	5	12 12
4 FT	8	8	8	8	4	10.5	4	12	32.1	24.0	24.0	4	20	38.0	46.0	4	20	20.0	20.0	4	12	4	12	28.4	40	52	4	8.5	29.0	30.0	5	12	5	12 12
6 FT	8	8	8	8	4	12	4	12	29.3	24.0	24.0	4	21	31.0	34.0	4	21	20.0	20.0	4	12	4	12	27.0	40	52	4	8	28.0	29.0	5	12	5	12 12
8 FT	8	8	8	8	4	12	4	12	27.5	24.0	24.0	4	20	30.0	31.0	4	20	19.0	19.0	4	11	4	11	26.3	40	52	4	7	28.0	29.0	5	12	5	12 0
10 FT	8	8	8	8	4	11	4	12	26.6	24.0	24.0	4	18	29.0	30.0	4	18	19.0	19.0	4	9.5	4	10.5	25.6	40	52	4	6.5	27.0	29.0	5	12	5	12 0
12 FT	8	8	8	8	4	10	4	10.5	26.1	24.0	24.0	4	16	28.0	30.0	4	16	19.0	19.0	4	8	4	9.5	25.3	40	52	4	6	27.0	29.0	5	12	5	12 0
14 FT	8	8	8	8	4	8.5	4	9.5	25.6	24.0	24.0	4	14	28.0	29.0	4	14	19.0	19.0	4	7	4	8.5	25.0	40	52	5	7	27.0	29.0	5	12	5	12 0
16 FT	8	9	8	8	4	8	4	8.5	25.6	24.0	24.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	4	11	24.3	41	53	4	6	27.0	29.0	5	12	5	12 0
18 FT	8	9	8	8	4	7.5	4	8	24.8	24.0	24.0	4	12	27.0	28.0	4	12	19.0	19.0	4	7	4	10.5	23.5	41	53	4	6	27.0	29.0	5	12	5	12 0
20 FT	8	9	8	8	4	7	4	7.5	24.6	24.0	24.0	5	17	27.0	28.0	5	17	19.0	19.0	4	6	4	9.5	23.5	41	53	5	7	27.0	29.0	5	12	5	12 0
22 FT	9	10	8	8	4	7	4	9	24.3	25.0	25.0	4	12	27.0	29.0	4	12	19.0	19.0	4	6.5	4	12	23.1	42	54	4	6	27.0	29.0	5	12	5	12 0
24 FT	9	11	8	8	4	6.5	4	8	24.4	25.0	25.0	5	17	27.0	29.0	5	17	19.0	19.0	4	6.5	4	10.5	22.6	43	55	4	6	26.0	30.0	5	12	5	12 0
26 FT	10	11	8	8	4	6.5	4	8.5	23.9	26.0	26.0	5	18	26.0	29.0	5	18	19.0	19.0	4	6	4	10.5	22.9	43	55	5	8	26.0	29.0	5	12	5	12 0
28 FT	10	11	8	8	4	6	4	8	23.9	26.0	26.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	10.5	22.9	43	55	5	8	26.0	29.0	5	12	5	12 0
30 FT	10	12	8	8	5	8	4	7	24.0	26.0	26.0	5	16	26.0	29.0	5	16	19.0	19.0	5	9	4	9.5	22.5	44	56	5	8.5	26.0	30.0	5	12	5	12 0
32 FT	11	12	8	8	5	9	4	8	23.6	27.0	27.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	9.5	22.8	44	56	5	8	26.0	30.0	5	12	5	12 0
34 FT	11	13	8	8	5	8.5	4	7	23.8	27.0	27.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8.5	4	8.5	22.5	45	57	5	8.5	26.0	30.0	5	12	5	12 0
36 FT	12	13	8	8	5	8.5	4	8	23.5	28.0	28.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8	4	8.5	22.8	45	57	5	8	26.0	30.0	5	12	5	12 0
38 FT	12	14	8	8	5	8	4	7	23.6	28.0	28.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8	4	7.5	22.6	46	58	5	8.5	26.0	30.0	5	12	5	12 0
40 FT	13	14	8	8	5	8	4	7.5	23.4	29.0	29.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8	4	7.5	22.8	46	58	5	8	26.0	30.0	5	12	5	12 0
42 FT	13	14	8	8	5	7.5	4	7.5	23.4	29.0	29.0	5	16	26.0	29.0	5	16	19.0	19.0	5	7.5	4	7.5	22.8	46	58	5	7.5	26.0	30.0	5	12	5	12 0
44 FT	13	15	8	8	5	7.5	4	7	23.6	29.0	29.0	5	15	26.0	29.0	5	15	19.0	19.0	5	7.5	4	7	22.8	47	59	5	8	26.0	30.0	5	12	5	12 0
46 FT	14	15	8	8	5	7.5	4	7	23.4	30.0	30.0	5	16	25.0	29.0	5	16	18.0	19.0	5	7.5	4	7	22.9	47	59	5	7.5	26.0	30.0	5	12	5	12 0
48 FT	14	15	8	8	5	7	4	7	23.4	30.0	30.0	5	15	25.0	29.0	5	15	18.0	19.0	5	7	4	7	22.9	47	59	5	7	26.0	30.0	5	12	5	12 0
50 FT	14	16	8	8	5	7	4	6.5	23.6	30.0	30.0	5	15	25.0	29.0	5	15	18.0	19.0	5	7	4	6.5	22.9	48	60	5	7.5	26.0	30.0	5	12	5	12 0

												SPA	N (S	5) = 5	FT			HEIG	HT (F	IT)	= 5	FT (	OR 6	FT											
		MEM										TOP :	SLAB	BARS										E	MOTTO	SLAB E	BARS					WAL	L BAR	(S	
DESIGN		LH I CK	NES:	5	A1 E	BARS			J3	BARS			Н1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 E	BARS	B2	BARS	
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=5'	.2 HT=6′	SIZE	SPA.	C5	08	SIZE	SPA.	C6	<b>Q</b> 9	SIZE	SPA.	SIZE	SPA.	C4	HT=5'		SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	22	56.5	42.5	4	22	23.0	23.0	4	12	4	10	47.5	64	76	4	8.5	31.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	9.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	22.0	22.0	4	11	4	9.5	42.8	64	76	4	8	30.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	10	4	10	33.9	24.0	24.0	4	20	56.5	46.0	4	20	21.0	21.0	4	12	4	9	38.9	64	76	4	8.5	29.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	10.5	38.3	24.0	24.0	4	21	33.0	35.0	4	21	20.0	20.0	4	12	4	8.5	35.5	64	76	4	7.5	28.0	30.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	10	34.4	24.0	24.0	4	20	30.0	31.0	4	20	19.0	20.0	4	10.5	4	8	33.5	64	76	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	8	8	4	10.5	4	9	32.9	24.0	24.0	4	18	29.0	30.0	4	18	19.0	19.0	4	9	4	7.5	32.3	64	76	4	6.5	27.0	29.0	5	12	5	12	0
12 FT	8	8	8	8	4	9.5	4	8	31.9	24.0	24.0	4	16	28.0	30.0	4	16	19.0	19.0	4	7.5	4	7	31.3	64	76	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	8	8	8	4	8.5	4	7	31.1	24.0	24.0	4	14	28.0	29.0	4	14	19.0	19.0	4	7	4	6	30.8	64	76	5	7	27.0	29.0	5	12	5	12	0
16 FT	8	9	8	8	4	8	4	6.5	30.8	24.0	24.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	4	7	30.9	65	77	4	6	27.0	29.0	5	12	5	12	0
18 FT	8	9	8	8	4	7.5	4	6.5	29.1	24.0	24.0	4	12	27.0	28.0	4	12	19.0	19.0	4	6.5	4	7	29.1	65	77	4	6	27.0	29.0	5	12	5	12	0
20 FT	8	9	8	8	4	7	5	7	29.0	24.0	24.0	5	17	27.0	28.0	5	17	19.0	19.0	4	6	4	6.5	29.0	65	77	5	7.5	27.0	29.0	5	12	5	12	0
22 FT	9	10	8	8	4	7	4	6.5	29.1	25.0	25.0	4	12	26.0	29.0	4	12	19.0	19.0	4	6	4	7.5	29.3	66	78	4	6	27.0	29.0	5	12	5	12	0
24 FT	9	10	8	8	4	6.5	4	6	29.1	25.0	25.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	7	29.1	66	78	5	7.5	27.0	29.0	5	12	5	12	0
26 FT	10	11	8	8	4	6.5	5	8	29.4	26.0	26.0	4	12	26.0	29.0	4	12	19.0	19.0	4	6	4	6.5	29.4	67	79	5	8.5	26.0	29.0	5	12	5	12	0
28 FT	10	11	8	8	4	6	5	7.5	29.3	26.0	26.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	4	6	29.4	67	79	5	8	26.0	29.0	5	12	5	12	0
30 FT	10	12	8	8	5	8.5	5	7.5	29.3	26.0	26.0	5	16	26.0	29.0	5	16	19.0	19.0	5	9	4	6	29.5	68	80	5	8.5	26.0	30.0	5	12	5	12	0
32 FT	11	12	8	8	5	9	5	8	29.5	27.0	31.0	5	17	26.0	29.0	5	17	19.0	19.0	5	8.5	5	8	29.6	68	80	5	8	26.0	30.0	5	12	5		0
34 FT	11	13	8	8	5	8.5	5	7.5	29.5	27.0	31.0	5	16	26.0	29.0	5	16	19.0	19.0	5	8.5	5	8.5	29.8	69	81	5	8.5	26.0	30.0	5	12	5 1		0
36 FT	12	13	8	8	5	8.5	5	8	29.8	28.0	32.0	5	17	26.0	29.0	5	17	18.0	19.0	5	8	5	8	29.9	69	81	5	8	26.0	30.0	5	12	5	11	0
38 FT	12	14	8	8	5	8	5	7.5	29.8	28.0	32.0	5	16	26.0	29.0	5	16	18.0	19.0	5	8.5	5	8.5	30.1	70	82	5	8.5	26.0	30.0	5	12	5		0
40 FT	12	14	8	8	5	7.5	5	7	29.8	28.0	32.0	5	15	26.0	29.0	5	15	18.0	19.0	5	8	5	8	30.0	70	82	5	8	26.0	30.0	5	12	-	9.5	0
42 FT	13	14	8	8	5	8	5	7.5	29.9	29.0	33.0	5	16	26.0	29.0	5	16	18.0	19.0	5	7.5	5	7.5	30.1	70	82	5	7.5	26.0	30.0	5	12	-	9.5	0
44 FT	13	15	8	8	5	7.5	5	7	30.0	29.0	33.0	5	15	26.0	29.0	5	15	18.0	19.0	5	8	5	8	30.4	71	83	5	8	27.0	30.0	5	12	-	9.5	0
46 FT	14	15	8	8	5	7.5	5	6.5	30.1	30.0		5	16	26.0	28.0	5	16	18.0	19.0	5	7.5	5	7.5	30.5	71	83	5	7.5	27.0	30.0	5	12	5	9.5	0
48 FT	14	15	9	8	5	7.5	5	8	30.6	30.0	34.0	5	16	26.0	28.0	5	16	18.0	19.0	5	7.5	5	8	30.8	71	83	5	7.5	27.0	30.0	5	12	5	9	0
50 FT	14	16	9	8	5	7	5	7.5	30.8	30.0	34.0	5	15	26.0	28.0	5	15	18.0	19.0	5	7.5	5	8	31.0	72	84	5	7.5	27.0	30.0	5	12	5	8.5	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SPAN (S): 5 FEET HE[GHT (HT): 3 THRU 6 FEET

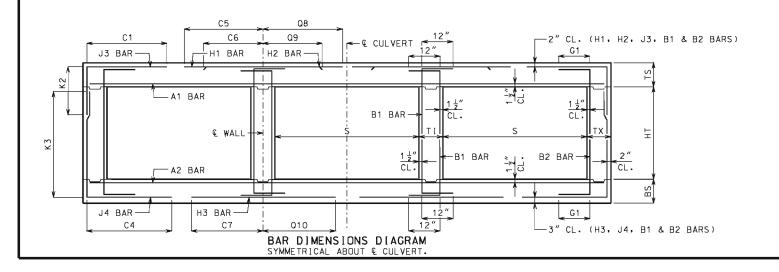
DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 4 OF 27

												SP	NI (S	5) = 5	FT			HEIG	HT (F	IT )	- 7	ET (	OR 8	FT											一
		MEN	DED										SLAB I		, , ,			IIL I O	111 (1	<del>'' '</del>			OIV O		воттом	SIAR	ADC				Г	WAI	L BAF	<del></del>	$\dashv$
DEGLON	-	MEM THICK		S	A1	BARS	Г		.12	BARS		T		BARS		1	Н2	BARS		۸2	BARS				BARS	JLAD L	JANS	нз	BARS		B1	,,,,,		BARS	-1
DESIGN FILL							<u> </u>				(2	+		DANS				DAILS		<del></del>						3									
	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		HT=8'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	HT=8'	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA.	G1
1 FT	11	8	8	8	4	6	4	9	33.9	27.0	27.0	4	22	56.5	42.5	4	22	23.0	23.0	4	11	4	7	48.0	88	100	4	8	46.0	31.0	5	12	5	12	12
2 FT	11	8	8	8	4	6	4	8.5	33.9	27.0	27.0	4	21	56.5	42.5	4	21	23.0	23.0	4	10.5	4	6.5	48.0	88	100	4	8	32.0	31.0	5	12	5	12	12
4 FT	8	8	8	8	4	9.5	4	7	33.9	24.0	24.0	4	20	56.5	46.0	4	20	21.0	21.0	4	11.5	4	6	48.0	88	100	4	8	31.0	30.0	5	12	5	12	12
6 FT	8	8	8	8	4	12	4	7	33.9	24.0	24.0	4	21	56.5	35.0	4	21	20.0	20.0	4	11	5	6	48.0	88	100	4	7.5	29.0	30.0	5	12	5	12	12
8 FT	8	8	8	8	4	12	4	6.5	51.8	24.0	24.0	4	20	34.0	31.0	4	20	19.0	20.0	4	10	5	6	46.0	88	100	4	7	28.0	29.0	5	12	5	12	0
10 FT	8	8	9	8	4	11	4	7	43.8	24.0	24.0	4	18	30.0	30.0	4	18	19.0	20.0	4	9	4	6	41.6	88	100	4	6.5	28.0	29.0	5	12	5	12	0
12 FT	8	8	9	8	4	9.5	4	6	41.3	24.0	24.0	4	16	29.0	30.0	4	16	19.0	19.0	4	8	5	6	40.4	88	100	4	6	27.0	29.0	5	12	5	12	0
14 FT	8	9	9	8	4	9	5	7	39.9	24.0	28.0	4	15	28.0	29.0	4	15	19.0	19.0	4	8	5	6.5	41.4	89	101	4	6.5	27.0	29.0	5	12	5	11.5	0
16 FT	8	9	9	8	4	8	5	6	39.1	24.0	28.0	4	13	28.0	29.0	4	13	19.0	19.0	4	7	5	6	40.8	89	101	4	6	27.0	29.0	5	12	5	11	0
18 FT	8	9	9	8	4	7.5	5	6	36.5	24.0	28.0	4	13	26.0	28.0	4	13	19.0	19.0	4	7	5	6	38.1	89	101	4	6	27.0	29.0	5	12	5	11.5	0
20 FT	8	9	9	8	4	7	6	7	39.1	24.0	32.0	5	18	26.0	28.0	5	18	19.0	19.0	4	6	6	7	40.9	89	101	5	7.5	27.0	29.0	5	12	5	10.5	0
22 FT	8	10	9	8	4	6.5	6	7	38.8	24.0	28.0	5	17	27.0	28.0	5	17	19.0	20.0	4	6.5	5	6	39.0	90	102	5	8	27.0	29.0	5	12	5	10	0
24 FT	9	11	9	8	4	6.5	5	6	37.0	25.0	29.0	5	18	26.0	28.0	5	18	19.0	19.0	4	6.5	5	6	39.8	91	103	4	6	27.0	29.0	5	12	5	9.5	0
26 FT	9	11	9	8	4	6	5	6	36.9	25.0	29.0	5	16	26.0	28.0	5	16	19.0	19.0	4	6	5	6	39.6	91	103	5	8.5	27.0	29.0	5	12	5	8.5	0
28 FT	10	12	9	8	4	6	5	6	37.9	30.0	30.0	5	17	26.0	28.0	5	17	19.0	19.0	4	6	5	6	40.3	92	104	4	6	27.0	29.0	5	12	5	8.5	0
30 FT	10	12	9	8	4	6	5	6	37.8	30.0	30.0	5	16	26.0	28.0	5	16	19.0	19.0	4	6	6	7.5	43.1	92	104	5	8.5	27.0	29.0	5	12	5	8.5	0
32 FT	11	12	10	8	4	6	5	6.5	38.4	31.0	31.0	5	17	26.0	28.0	5	17	18.0	19.0	5	9	5	6.5	39.6	92	104	5	8	27.0	29.0	5	12	5	8	0
34 FT	11	13	10	8	5	9	5	6.5	38.3	31.0	31.0	5	16	26.0	28.0	5	16	19.0	19.0	5	9	5	6.5	40.4	93	105	5	8.5	28.0	30.0	5	12	5	8	0
36 FT	12	13	10	8	5	9	5	6.5	39.1	32.0	32.0	5	17	26.0	28.0	5	17	18.0	19.0	5	8.5	5	6.5	40.3	93	105	5	8	27.0	30.0	5	12	5	8	0
38 FT	12	14	10	8	5	8.5	5	6	39.0	32.0	32.0	5	17	26.0	28.0	5	17	18.0	19.0	5	9	5	6.5	40.9	94	106	5	8.5	28.0	30.0	5	12	5	8	0
40 FT	12	14	11	8	5	8	5	7	38.9	32.0	32.0	5	16	26.0	28.0	5	16	18.0	19.0	5	8.5	5	7	40.8	94	106	5	8	28.0	30.0	5	12	5	7.5	0
42 FT	13	14	11	8	5	8.5	5	7	39.6	33.0	33.0	5	17	26.0	28.0	5	17	18.0	19.0	5	8	5	7	40.5	94	106	5	7.5	28.0	30.0	5	12	5	7.5	0
44 FT	13	15	11	8	5	8	5	6.5	39.5	33.0	33.0	5	16	26.0	28.0	5	16	18.0	19.0	5	8	5	7	41.3	95	107	5	8	28.0	30.0	5	12	5	7.5	0
46 FT	13	15	12	8	5	7.5	5	6.5	39.5	33.0	33.0	5	15	26.0	28.0	5	15	18.0	19.0	5	8	5	6.5	41.0	95	107	5	7.5	28.0	30.0	5	12	5	7	0
48 FT	14	15	12	8	5	8	5	6.5	40.3	34.0	34.0	5	17	26.0	27.0	5	17	18.0	19.0	5	7.5	5	6.5	40.9	95	107	5	7	28.0	30.0	5	12	5	7	0
50 FT	14	16	12	8	5	7.5	5	6.5	40.1	34.0	34.0	5	16	26.0	27.0	5	16	18.0	19.0	5	8	5	6.5	41.6	96	108	5	7.5	28.0	30.0	5	12	5	7	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET HE[GHT (HT): 7 THRU 8 FEET

DATE EFFECTIVE: DATE PREPARED:

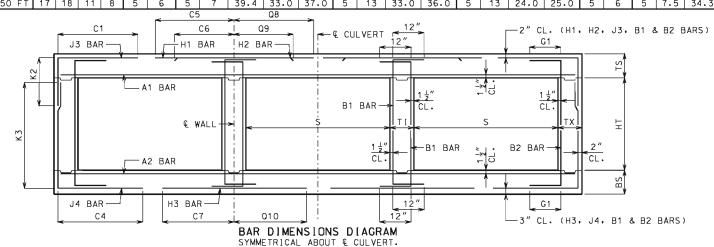
12/01/2011 9/29/2011

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SHEET NO. 5 OF 27

											SPAN	1 (5	) =	6 FT			HF I	GHT (	HT) =	: 3	FT O	R 4	FT (	DR 5 I	FΤ										
		MEMB	FR	Т							TOP SL														BOTTOM	SLAB	BARS					П	WAL	L BA	RS
DESIGN		HICKN		A1	BARS			J.	3 BARS			Г		BARS			Н2	BARS		A2	BARS				BARS				НЗ	BARS		В1	BARS		2 BARS
FILL	TS	BS	тх т	I SIZ	SPA.	SIZE	SPA.	C1	HT=3'	K2   HT=4 '	HT=5′	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=3'	K3 HT=4'	HT=5'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	11	8	8 8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	24.0	23.0	4	10	4	10	38.1	40	52	64	4	7.5	33.0	34.0	5	12	5	12 12
2 FT	11	8	8 8	5	8	4	9.5	37.5	27.0	27.0	27.0	4	17	64.5	48.5	4	17	23.0	22.0	4	9.5	4	9	35.1	40	52	64	4	7	33.0	34.0	5	12	5	12 12
4 FT	8	8	8 8	4	7.5	4	8.5	35.8	24.0	24.0	24.0	4	14	43.0	52.0	4	14	21.0	21.0	4	9	4	9.5	32.1	40	52	64	4	6.5	32.0	33.0	5	12	5	12 12
6 FT	8	8	8 8	4	9	4	9.5	32.6	24.0	24.0	24.0	4	14	35.0	38.0	4	14	21.0	20.0	4	8.5	4	8.5	30.0	40	52	64	4	6	31.0	32.0	5	12	5	12 12
8 FT	8	8	8 8	4	9	4	9	30.4	24.0	24.0	24.0	4	13	33.0	35.0	4	13	20.0	20.0	4	8	4	8	29.0	40	52	64	5	7.5	30.0	32.0	5	12	5	12 0
10 FT	8	8	8 8	4	8	4	8	29.4	24.0	24.0	24.0	4	12	32.0	34.0	4	12	20.0	20.0	4	7	4	7	28.4	40	52	64	5	6.5	30.0	32.0	5	12	5	12 0
12 FT	8	9	8 8	4	7	4	7	28.8	24.0	24.0	24.0	5	17	31.0	33.0	5	17	20.0	20.0	4	6.5	4	9	27.4	41	53	65	5	7	30.0	32.0	5	12	5	12 0
14 FT	8	9	8 8	4	6.5	4	6.5	28.3	24.0	24.0	24.0	5	16	31.0	32.0	5	16	21.0	21.0	5	9	4	8	26.9	41	53	65	5	6.5	30.0	32.0	5	12	5	12 0
16 FT	9	10	8 8	4	6	4	7.5	27.6	25.0	25.0	25.0	5	16	30.0	33.0	5	16	20.0	20.0	5	9	4	9.5	26.5	42	54	66	5	7	29.0	32.0	5	12	5	12 0
18 FT	9	10	8 8	5	9	4	6.5	27.4	25.0	25.0	25.0	5	16	30.0	32.0	5	16	21.0	21.0	5	8	4	8.5	26.3	42	54	66	5	6.5	29.0	32.0	5	12	5	12 0
20 FT	10	11	8 8	_	9	4	7	27.0	26.0	26.0	26.0	5	15	30.0	33.0	5	15	20.0	20.0	5	8	4	8.5	26.0	43	55	67	5	7	29.0	33.0	5	12	5	12 0
22 FT	10	11	8 8	5	8.5	4	6.5	26.0	26.0	26.0	26.0	5	15	29.0	32.0	5	15	20.0	20.0	5	7.5	4	8.5	25.0	43	55	67	5	7	29.0	33.0	5	12	5	12 0
24 FT	11	12	8 8	_	8.5	4	6.5	25.8	27.0	27.0	27.0	5	15	29.0	32.0	5	15	20.0	20.0	5	8	4	8.5	24.9	44	56	68	5	7	29.0	33.0	5	12	5	12 0
26 FT	11	12	8 8	_	7.5	4	6	25.6	27.0	27.0		5	14	29.0	32.0	5	14	20.0	20.0	5	6.5	4	8	24.9	44	56	68	5	6.5	29.0	33.0	5	12	5	12 0
28 FT	12	13	8 8	_	7.5	4	6.5	25.5	28.0	28.0	28.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7.5	4	8	24.9	45	57	69	5	7	29.0	33.0	5	12	5	12 0
30 FT		14	8 8	-	7	4	6	25.6	28.0	28.0	28.0	5	13	29.0	32.0	5	13	19.0	20.0	5	7.5	4	7.5	24.8	46	58	70	5	7	28.0	33.0	5	12	5	12 0
32 FT	13	14	8 8		7	4	6	25.4	29.0	29.0	29.0	5	14	28.0	33.0	5	14	19.0	20.0	5	7	4	7.5	24.9	46	58	70	5	6.5	28.0	33.0	5	12	5	12 0
34 FT	13	15	8 8	Ť	7	5	8.5	25.6	29.0	29.0	29.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	4	7	24.8	47	59	71	5	7	28.0	33.0	5	12	5	12 0
36 FT	14	15	8 8	Ť	7	4	6	25.4	30.0	30.0	30.0	5	13	28.0	33.0	5	13	19.0	20.0	5	6.5	4	7	25.0	47	59	71	5	6.5	28.0	33.0	5	12	5	12 0
38 FT	14	16	8 8		6.5	5	8.5	25.5	30.0	30.0	30.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	4	6.5	24.9	48	60	72	5	6.5	28.0	33.0	5	12	5	12 0
40 FT	15	16	8 8	Ť	6.5	5	8	30.4	31.0	31.0	31.0	5	13	33.0	38.0	5	13	24.0	25.0	5	6.5	4	6.5	25.1	48	60	72	5	6.5	28.0	33.0	5	12	5	12 0
42 FT	15	17	8 8	Ť	6.5	5	8	30.6	31.0	31.0	31.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6.5	4	6	25.1	49	61	73	5	6.5	28.0	33.0	5	12	5	12 0
44 FT	16	17	8 8		6.5	5	7	30.5	32.0	32.0	32.0	5	13	33.0	37.0	5	13	24.0	25.0	5	6.5	4	6	25.3	49	61	73	5	6	28.0	33.0	5	12	5	12 0
46 FT	16	17	8 8		6	5	7	30.5	32.0	32.0	32.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6	4	6	25.3	49	61	73	5	6	28.0	33.0	5	12	5	12 0
48 FT	_	18	8 8		6	5	6.5	30.6	37.0	37.0	37.0	5	13	33.0	37.0	5	13	24.0	25.0	5	6	5	6.5	25.5	50	62	74	5	6	28.0	33.0	5	12	5	11 0
50 FT	17	18	8 8	5	6	5	6.5	30.6	37.0	37.0	37.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6	5	6.5	25.4	50	62	74	5	6	28.0	33.0	5	12	5	10.5 0

												SPA		5) = 6	FT			HEIG	HT (F	IT)	= 6	FT (	OR 7	FT										
	Ι.	MEM		.								TOP S	SLAB												MOTTO	SLAB	BARS					WAL		
DESIGN		THICK	NE 55	<u>,                                    </u>	A1 [	BARS			J3	BARS	_		H1	BARS			H2	2 BARS		A2	BARS			J4	BARS			Н3	BARS		B1 E	BARS	B2	2 BARS
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		2 HT=7'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=6'		SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G
1 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	24.0	24.0	4	9.5	4	7.5	52.8	76	88	4	7	34.0	34.0	5	12	5	12 1
2 FT	11	8	8	8	5	8	4	9.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	23.0	23.0	4	8.5	4	7	47.3	76	88	4	6.5	33.0	34.0	5	12	5	12 1
4 FT	8	8	8	8	4	7	4	7	37.5	24.0	24.0	4	14	64.5	52.0	4	14	21.0	22.0	4	8.5	4	7	43.0	76	88	4	6.5	32.0	34.0	5	12	5	12 1
6 FT	8	8	8	8	4	8.5	4	7.5	41.9	24.0	24.0	4	14	37.0	39.0	4	14	21.0	21.0	4	8	4	6.5	39.1	76	88	4	6	31.0	33.0	5	12	5	12 1
8 FT	8	8	8	8	4	8.5	4	7	37.6	24.0	24.0	4	13	34.0	35.0	4	13	20.0	20.0	4	7.5	4	6	36.9	76	88	5	7	30.0	32.0	5	12	5	12 (
10 FT	8	8	8	8	4	8	4	6	36.0	24.0	24.0	4	12	32.0	34.0	4	12	20.0	20.0	4	6.5	5	6	35.4	76	88	5	6.5	30.0	32.0	5	12	5	12 (
12 FT	8	9	8	8	4	7	5	6.5	34.8	24.0	24.0	5	17	31.0	33.0	5	17	20.0	20.0	4	6.5	4	6	35.0	77	89	5	7	30.0	32.0	5	12	5	12 (
4 FT	8	9	8	8	4	6	5	6	33.9	24.0	28.0	5	16	31.0	33.0	5	16	21.0	21.0	5	8.5	5	6.5	34.1	77	89	5	6.5	30.0	32.0	5	12	5	12 (
6 FT	9	10	8	8	4	6	5	6.5	33.8	25.0	25.0	5	16	30.0	33.0	5	16	20.0	20.0	5	9	4	6	34.0	78	90	5	7	29.0	33.0	5	12	5	12 (
8 FT	9	10	8	8	5	9	5	6.5	33.4	25.0	29.0	5	16	30.0	32.0	5	16	21.0	21.0	5	8	5	6.5	33.6	78	90	5	6.5	29.0	32.0	5	12	5	12 (
20 FT	9	11	8	8	5	8	5	6	33.1	25.0	29.0	5	16	30.0	32.0	5	16	21.0	22.0	5	8	5	7	33.8	79	91	5	7.5	29.0	33.0	5	12	5	12 (
22 FT	10	11	8	8	5	8.5	5	7	31.6	26.0	30.0	5	15	29.0	32.0	5	15	20.0	20.0	5	7.5	5	7	31.9	79	91	5	7	29.0	33.0	5	12	5	12 (
24 FT	10	12	8	8	5	7.5	5	6.5	31.6	26.0	30.0	5	15	29.0	32.0	5	15	20.0	21.0	5	8	5	7.5	32.0	80	92	5	7	29.0	33.0	5	12	5	12 (
26 FT	11	13	8	8	5	8	5	6.5	31.9	27.0	31.0	5	14	29.0	32.0	5	14	20.0	20.0	5	8	5	7.5	32.3	81	93	5	7.5	29.0	33.0	5	12	5	11 (
28 FT	12	13	8	8	5	8	5	7	31.9	28.0	32.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7.5	5	7	32.3	81	93	5	7	29.0	33.0	5	12	5	10 (
30 FT	12	14	8	8	5	7.5	5	6.5	32.0	28.0	32.0	5	13	29.0	32.0	5	13	19.0	20.0	5	7.5	5	7.5	32.4	82	94	5	7	29.0	33.0	5	12	-	9.5
32 FT	13	14	8	8	5	7.5	5	6.5	32.0	33.0	33.0	5	14	28.0	32.0	5	14	19.0	20.0	5	7	5	7	32.5	82	94	5	6.5	29.0	33.0	5	12		9.5
34 FT	13	15	8	8	5	7	5	6.5	32.1	33.0	33.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	5	7	32.6	83	95	5	7	29.0	33.0	5	12	_	9.5
36 FT	14	15	8	8	5	7	5	6	32.3	34.0	34.0	5	14	28.0	32.0	5	14	19.0	20.0	5	7	5	6.5	32.8	83	95	5	6.5	29.0	33.0	5	12	_	9.5
38 FT	14	16	9	8	5	6.5	5	7	32.9	30.0	34.0	5	13	28.0	32.0	5	13	19.0	20.0	5	7	5	8	33.1	84	96	5	6.5	29.0	33.0	5	12	_	8.5
10 FT	14	16	10	8	5	6	5	7.5	33.3	30.0	34.0	5	12	28.0	32.0	5	12	19.0	20.0	5	6.5	5	7.5	33.4	84	96	5	6.5	29.0	33.0	5	12	_	9.5
12 FT	15	17	10	8	5	6.5	5	7.5	38.5	31.0	35.0	5	13	33.0	37.0	5	13	24.0	25.0	5	7	5	7.5	33.6	85	97	5	6.5	29.0	33.0	5	12	5	9 (
14 FT	15	17	10	8	5	6.5	5	7.5	38.5	31.0	35.0	5	12	33.0	37.0	5	12	24.0	25.0	5	6.5	5	7.5	33.6	85	97	5	6	29.0	33.0	5	12	-	8.5 (
16 FT	16	17	10	8	5	6.5	5	7	38.6	32.0	36.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6	5	7.5	33.8	85	97	5	6	29.0	33.0	5	12	5	8 (
48 FT	16	18	11	8	5	6	5	7	39.3	32.0	36.0	5	12	33.0	36.0	5	12	24.0	25.0	5	6.5	5	7.5	34.1	86	98	5	6	29.0	34.0	5	12	-	8.5
O FT	17	18	11	8	5	6	5	7	39.4	33.0	37.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6	5	7.5	34.3	86	98	5	6	29.0	33.0	5	12	5	8 0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT DR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SPAN (S): 6 FEET HE[GHT (HT): 3 THRU 7 FEET

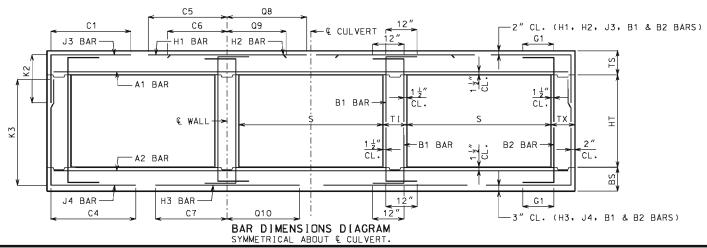
DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 6 OF 27

1												SD/	M (S	) = 6	СТ			HEIC	HT (F	ıT \	<b>–</b> Ω	CT (	np a	СТ											$\equiv$
<b>/</b>		N I TO N I											SLAB I		, , ,			HE I G	111 (1	<del>                                     </del>	- 0		)IV 3		NOTTON	SLAB E	ADC					WAI	L BAR	c	-
il .	١ ,	MEM HICK		5	A 1	BARS			12	BARS		TUP		BARS		т —	112	BARS		4.2	BARS				BARS	SLAD I	JAKS	112	BARS		B1 E	,,,,,		BARS	-
DESIGN. FILL		111101			AI	DARS			0.0		(2	-		DANS		-	ПZ	DANS		AZ	DARS					.3			DARS		011	DAKS		DARS	-
1 - 1 - 1	TS	BS	ΤX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		HT=9'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	.3 HT=9'	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G	<i>i</i> 1
1 FT	11	8	8	8	5	7.5	4	7	37.5	27.0	27.0	4	17	64.5	48.5	4	17	24.0	25.0	4	8.5	5	6.5	54.0	100	112	4	7	52.0	35.0	5	12	5	12 1	2
2 FT	11	8	8	8	5	7.5	4	6.5	37.5	27.0	27.0	4	17	64.5	48.5	4	17	23.0	24.0	4	8	5	6	54.0	100	112	4	6.5	35.0	34.0	5	12	5	12 1	2
4 FT	8	8	9	8	4	7	4	6	38.1	24.0	24.0	4	14	64.5	52.0	4	14	22.0	22.0	4	8	5	6.5	54.8	100	112	4	6	33.0	34.0	5	12	5	12 1	2
6 FT	8	8	9	8	4	8.5	4	6	38.1	24.0	24.0	4	14	64.5	40.0	4	14	21.0	21.0	4	8	5	6	50.8	100	112	4	6	32.0	33.0	5	12	5	12 1	2
8 FT	8	9	9	8	4	8.5	4	6	50.1	24.0	24.0	4	14	35.0	35.0	4	14	20.0	20.0	4	8.5	5	6.5	50.8	101	113	4	6.5	31.0	33.0	5	12	5	12 (	٦
10 FT	8	9	9	8	4	8	5	6.5	45.8	24.0	28.0	4	12	33.0	33.0	4	12	20.0	20.0	4	7.5	5	6	47.5	101	113	4	6	31.0	33.0	5	12	5	11 (	ΣĪ
12 FT	8	9	10	8	4	7	5	6.5	43.0	24.0	28.0	5	17	32.0	33.0	5	17	20.0	20.0	4	6.5	5	6.5	44.8	101	113	5	7	30.0	32.0	5	12	5	11 (	ΣĪ
14 FT	8	9	10	8	4	6.5	5	6	41.6	28.0	28.0	5	17	31.0	32.0	5	17	21.0	21.0	4	6	5	6	43.5	101	113	5	6.5	30.0	32.0	5	12	5	10 (	5
16 FT	8	10	10	8	4	6	6	7	43.3	28.0	28.0	5	16	30.0	32.0	5	16	22.0	22.0	5	9	5	6	44.4	102	114	5	7	30.0	33.0	5	12	5	9.5 (	5
18 FT	9	10	10	8	4	6	5	6	41.8	29.0	29.0	5	16	30.0	32.0	5	16	20.0	21.0	5	8.5	6	7.5	46.4	102	114	5	7	30.0	32.0	5	12	5	9 (	5
20 FT	9	11	10	8	5	8.5	5	6	41.0	29.0	29.0	5	16	30.0	32.0	5	16	21.0	22.0	5	8.5	5	6	44.4	103	115	5	7	30.0	33.0	5	12	5	8.5 (	5
22 FT	10	11	10	8	5	9	5	6.5	39.9	30.0	30.0	5	15	29.0	32.0	5	15	20.0	20.0	5	8	5	6	41.4	103	115	5	7	30.0	33.0	5	12	5	9 (	5
24 FT	10	12	10	8	5	8	5	6.5	39.5	30.0	30.0	5	15	29.0	32.0	5	15	20.0	21.0	5	8	5	6	42.3	104	116	5	7	30.0	33.0	5	12	5	8.5 (	5
26 FT	11	12	10	8	5	8	5	6	40.5	31.0	31.0	5	14	29.0	32.0	5	14	19.0	20.0	5	7	5	6	41.9	104	116	5	6.5	30.0	33.0	5	12	5	8 (	5
28 FT	11	13	10	8	5	7.5	5	6	40.3	31.0	31.0	5	14	29.0	32.0	5	14	20.0	20.0	5	7.5	5	6	42.8	105	117	5	7	30.0	33.0	5	12	5	8 (	5
30 FT	12	14	10	8	5	8	5	6	41.0	32.0	32.0	5	14	29.0	31.0	5	14	19.0	20.0	5	8	5	6	43.3	106	118	5	7	30.0	33.0	5	12	5	8 (	5
32 FT	12	14	11	8	5	7.5	5	6.5	40.8	32.0	32.0	5	13	29.0	31.0	5	13	19.0	20.0	5	7.5	5	7	42.9	106	118	5	6.5	30.0	33.0	5	12	5	7.5 (	J
34 FT	13	15	11	8	5	7.5	5	6.5	41.5	33.0	33.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7.5	5	7	43.5	107	119	5	7	30.0	33.0	5	12	5	7.5 (	J
36 FT	13	15	11	8	5	7	5	6	41.4	33.0	33.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.4	107	119	5	6.5	30.0	33.0	5	12	5	7.5 (	5
38 FT	14	16	12	8	5	7	5	6.5	42.1	34.0	34.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.8	108	120	5	6.5	30.0	33.0	5	12	5	7 (	5
40 FT	14	16	12	8	5	7	5	6	42.0	34.0	34.0	5	13	28.0	31.0	5	13	19.0	20.0	5	7	5	6.5	43.6	108	120	5	6.5	30.0	33.0	5	12	5	7 (	5
42 FT	15	17	12	8	5	7	5	6	47.6	35.0	35.0	5	13	33.0	36.0	5	13	24.0	25.0	5	7	5	6.5	44.3	109	121	5	6.5	30.0	33.0	5	12	5	7 (	5
44 FT	15	17	13	8	5	6.5	5	6	47.6	35.0	35.0	5	13	33.0	36.0	5	13	24.0	25.0	5	6.5	5	6	44.0	109	121	5	6	30.0	33.0	5	12	5	6.5 (	5
46 FT	15	17	13	8	5	6	5	6	47.6	35.0	35.0	5	12	33.0	36.0	5	12	24.0	25.0	5	6	5	6	43.9	109	121	5	6	30.0	33.0	5	12	5	6.5 (	5
48 FT	16	18	13	8	5	6.5	5	6	48.3	36.0	36.0	5	13	33.0	35.0	5	13	24.0	25.0	5	6.5	5	6	44.5	110	122	5	6	30.0	33.0	5	12	5	6.5 (	5
50 FT	16	18	14	8	5	6	5	6	48.3	36.0	36.0	5	12	33.0	35.0	5	12	24.0	25.0	5	6	5	6	44.3	110	122	6	8.5	32.0	37.0	5	12	5	6.5	5



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET HE[GHT (HT): 8 THRU 9 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

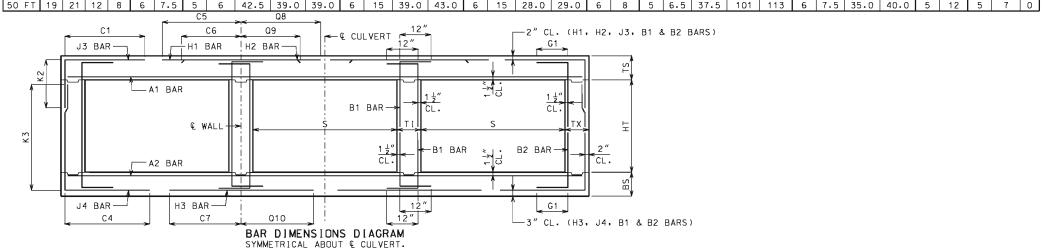
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SHEET NO. 7 OF 27

_	C5	Q8 Q9 2 BAR——	2" CL. (H1, H2, J3, B1 & B2 BARS)
K2 K2	A1 BAR	B1 BAR $\rightarrow$ $CL$ .	1 ½" CL. TX
, K3	A2 BAR	1½ CL. B1 BAR	B2 BAR 2" CL.
	J4 BAR   H3 BAR   C7   E	O10	G1 3" CL. (H3, J4, B1 & B2 BARS)

											SPAN	1 (5	) =	7 FT			HE I	GHT (	HT) =	= 4	FT OF	₹ 5	FT (	OR 6	FT										
		MEMB	ER								TOP SL	AB B	ARS											Е	BOTTOM	SLAB I	BARS						₩AL	L BA	RS
DESIGN	Т	HICKN	ESS	A 1	BARS			J:	3 BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				НЗ	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS	тх   т	SIZ	E SPA.	SIZE	SPA.	C1	HT=4'	K2 HT=5'	HT=6'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	K3 HT=5′	HT=6'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	12	8	8 8	5	7.5	4	8.5	41.1	28.0	28.0	28.0	4	16	72.5	54.5	4	16	25.0	25.0	4	8.5	4	7.5	42.5	52	64	76	4	6	36.0	37.0	5	12	5	12 12
2 FT	12	8	8 8	5	7.5	4	8.5	41.1	28.0	28.0	28.0	4	15	72.5	54.5	4	15	24.0	24.0	4	7.5	4	7	39.0	52	64	76	5	7.5	35.0	37.0	5	12	5	12 12
4 FT	8	8	8 8	4	6	4	6.5	39.5	24.0	24.0	24.0	5	17	47.0	58.0	5	17	23.0	23.0	4	7	4	7	36.0	52	64	76	5	7	35.0	37.0	5	12	5	12 12
6 FT	8	8	8 8	4	6.5	4	7	36.0	24.0	24.0	24.0	5	17	38.0	42.0	5	17	22.0	22.0	4	6.5	4	6.5	33.4	52	64	76	5	6.5	34.0	36.0	5	12	5	12 12
8 FT	8	8	8 8	4	6.5	4	6.5	33.5	24.0	24.0	24.0	5	17	36.0	38.0	5	17	23.0	22.0	5	9	4	6	32.0	52	64	76	5	6	33.0	35.0	5	12	5	12 0
10 FT	8	9	8 8	4	6	5	7	32.3	24.0	24.0	24.0	5	16	35.0	37.0	5	16	23.0	23.0	5	9	4	7	30.9	53	65	77	5	6.5	33.0	35.0	5	12	5	12 0
12 FT	8	9	8 8	4	6	5	6	31.4	24.0	24.0	24.0	5	14	34.0	36.0	5	14	23.0	23.0	5	7.5	4	6	30.1	53	65	77	5	6	32.0	35.0	5	12	5	12 0
14 FT	9	10	8 8	5	8.5	4	6	30.5	25.0	25.0	25.0	5	15	33.0	36.0	5	15	23.0	23.0	5	7.5	4	7	29.5	54	66	78	5	6	32.0	36.0	5	12	5	12 0
16 FT	10	11	8 8	5	8	5	8	29.9	26.0	26.0	26.0	5	15	33.0	36.0	5	15	22.0	22.0	5	7.5	4	7	29.0	55	67	79	5	6.5	32.0	36.0	5	12	5	12 0
18 FT	10	11	8 8	5	8	5	7.5	29.5	26.0	26.0	26.0	5	15	33.0	36.0	5	15	23.0	24.0	5	6	4	6.5	28.6	55	67	79	5	6	32.0	36.0	5	12	5	12 0
20 FT	11	12	8 8	5	7.5	5	8.5	29.1	27.0	27.0	27.0	5	14	32.0	36.0	5	14	22.0	23.0	5	6.5	4	6.5	28.4	56	68	80	5	6	31.0	36.0	5	12	5	12 0
22 FT	12	13	8 8	5	7	5	8.5	28.9	28.0	28.0	28.0	5	13	32.0	36.0	5	13	21.0	22.0	5	6.5	4	6	28.3	57	69	81	5	6	31.0	36.0	5	12	5	12 0
24 FT	12	13	8 8	5	7	5	8.5	27.6	28.0	28.0	28.0	5	13	31.0	36.0	5	13	21.0	22.0	5	6	4	6	27.1	57	69	81	6	8	34.0	39.0	5	12	5	12 0
26 FT	13	14	8 8	5	6.5	5	8.5	27.5	29.0	29.0	29.0	5	12	31.0	36.0	5	12	20.0	21.0	5	6.5	4	6	27.1	58	70	82	5	6	31.0	36.0	5	12	5	12 0
28 FT	13	15	8 8	5	6.5	5	8.5	27.6	29.0	29.0	29.0	5	12	31.0	36.0	5	12	21.0	22.0	5	6.5	4	6.5	27.0	59	71	83	5	6	31.0	37.0	5	12	5	12 0
30 FT	14	15	8 8	5	6	5	8.5	27.5	30.0	30.0	34.0	5	12	31.0	36.0	5	12	20.0	21.0	5	6	5	8.5	27.1	59	71	83	6	8	34.0	39.0	5	12	5	12 0
32 FT	15	16	8 8	5	6	5	8	32.5	31.0	31.0	35.0	6	17	39.0	45.0	6	17	29.0	30.0	5	6	5	8	27.3	60	72	84	6	8	34.0	40.0	5	12	5	12 0
34 FT	15	17	8 8	5	6	5	8	32.6	31.0	31.0	31.0	6	16	39.0	45.0	6	16	29.0	30.0	5	6	4	6	27.3	61	73	85	6	8.5	34.0	40.0	5	12	5	11.5 0
36 FT	16	17	8 8	5	6	5	7	32.5	32.0	32.0	36.0	6	16	39.0	45.0	6	16	29.0	30.0	6	8.5	5	7	27.4	61	73	85	6	8	34.0	40.0	5	12	5	11 0
38 FT	16	18	8 8	6	8	5	7	32.6	32.0	36.0	36.0	6	15	39.0	45.0	6	15	29.0	30.0	5	6	5	6.5	27.4	62	74	86	6	8	34.0	40.0	5	12	5	10 0
40 FT	17	18	8 8	6	8	5	6.5	32.6	37.0	37.0	37.0	6	16	39.0	45.0	6	16	29.0	30.0	6	8	5	6.5	27.6	62	74	86	6	7.5	34.0	40.0	5	12	5	9.5 0
42 FT	17	19	8 8	6	7.5	5	6.5	32.8	37.0	37.0	37.0	6	15	39.0	45.0	6	15	29.0	30.0	6	8	5	6.5	27.6	63	75	87	6	8	34.0	40.0	5	12	5	9.5 0
44 FT	18	19	8 8	6	7.5	5	6.5	32.6	38.0	38.0	38.0	6	15	39.0	45.0	6	15	29.0	30.0	6	7.5	5	6.5	27.8	63	75	87	6	7.5	34.0	40.0	5	12	5	9.5 0
46 FT	18	20	8 8	6	7.5	5	6.5	32.8	38.0	38.0	38.0	6	15	39.0	44.0	6	15	29.0	30.0	6	8	5	6	27.8	64	76	88	6	7.5	34.0	40.0	5	12	5	9.5 0
48 FT	19	20	8 8	6	7.5	5	6	32.8	39.0	39.0	39.0	6	15	39.0	44.0	6	15	29.0	30.0	6	7.5	5	6	27.9	64	76	88	6	7	34.0	40.0	5	12	5	9.5 0
50 FT	19	21	8 8	6	7	5	6	32.9	39.0	39.0	39.0	6	14	39.0	44.0	6	14	29.0	30.0	6	7.5	6	7.5	31.0	65	77	89	6	7.5	34.0	40.0	5	12	5	9 0

												SPA	N (S	<b>5)</b> = 7	7 FT			HEIG	HT (F	IT)	= 7	FT (	OR 8	FT											
		MEM										TOP :	SLAB	BARS										Е	: MOTTO	SLAB E	BARS					WAL	L BAF	RS	
DESIGN	]	TH I CK	NES:	S	A1 I	BARS			J3	BARS			H1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1	BARS	B2	BARS	;
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		(2   НТ=8′	SIZE	SPA.	C5	08	SIZE	SPA.	С6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=7'		SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G 1
1 FT	12	8	8	8	5	7.5	4	8	41.1	28.0	28.0	4	16	72.5	54.5	4	16	25.0	26.0	4	8	4	6	57.4	88	100	4	6	37.0	37.0	5	12	5	12	12
2 FT	12	8	8	8	5	7.5	4	7.5	41.1	28.0	28.0	4	15	72.5	54.5	4	15	25.0	25.0	4	7	5	6.5	51.3	88	100	5	7	36.0	37.0	5	12	5	12	12
4 FT	8	8	9	8	4	6	4	6	41.8	24.0	24.0	5	17	73.5	58.0	5	17	23.0	23.0	4	7	4	6.5	45.9	88	100	5	7	35.0	37.0	5	12	5	12	12
6 FT	8	8	9	8	4	6.5	4	6	44.3	24.0	24.0	5	17	40.0	43.0	5	17	22.0	22.0	4	6.5	5	6.5	41.8	88	100	5	6.5	34.0	36.0	5	12	5	12	12
8 FT	8	8	9	8	4	6.5	4	6	40.9	24.0	24.0	5	17	37.0	38.0	5	17	22.0	23.0	5	9	5	6	39.9	88	100	5	6	33.0	35.0	5	12	5	12	0
10 FT	8	9	9	8	4	6	5	6.5	39.1	24.0	28.0	5	16	35.0	37.0	5	16	23.0	23.0	5	9	5	7	39.4	89	101	5	6.5	33.0	36.0	5	12	5	12	0
12 FT	8	9	9	8	4	6	6	7	41.0	24.0	28.0	5	15	34.0	36.0	5	15	23.0	24.0	5	7	5	6	38.3	89	101	5	6	32.0	35.0	5	12	5	12	0
14 FT	9	10	9	8	5	8.5	5	6	37.8	25.0	29.0	5	15	34.0	36.0	5	15	23.0	23.0	5	7.5	5	6.5	37.9	90	102	5	6	32.0	36.0	5	12	5	12	0
16 FT	10	11	9	8	5	8	5	7	37.4	26.0	30.0	5	15	33.0	36.0	5	15	22.0	22.0	5	7.5	5	7	37.6	91	103	5	6.5	32.0	36.0	5	12	5	12	0
18 FT	10	11	9	8	5	8	5	6.5	36.8	30.0	30.0	5	15	33.0	36.0	5	15	23.0	23.0	5	6	5	6.5	36.9	91	103	5	6	32.0	36.0	5	12	5	12	0
20 FT	11	12	9	8	5	7.5	5	6.5	36.8	31.0	31.0	5	14	32.0	36.0	5	14	21.0	22.0	5	7	5	6.5	37.0	92	104	5	6	32.0	36.0	5	12	5	11	0
22 FT	11	13	9	8	5	7	5	6	36.5	31.0	31.0	5	14	32.0	35.0	5	14	22.0	23.0	5	7	5	7	37.0	93	105	5	6	32.0	36.0	5	12	5	10	0
24 FT	12	13	9	8	5	7	5	7	34.8	32.0	32.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6	5	7	35.0	93	105	6	8	34.0	39.0	5	12	5	10.5	0
26 FT	13	14	9	8	5	7	5	7	34.9	33.0	33.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6.5	5	7.5	35.3	94	106	5	6	31.0	36.0	5	12	5	9.5	0
28 FT	13	15	9	8	5	6.5	5	6.5	34.9	33.0	33.0	5	12	31.0	35.0	5	12	21.0	22.0	5	6.5	5	7.5	35.4	95	107	5	6	31.0	36.0	5	12	5	9	0
30 FT	14	15	9	8	5	6.5	5	7	35.0	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	7	35.4	95	107	6	8	34.0	39.0	5	12	5	8.5	0
32 FT	14	16	9	8	5	6	5	6	35.0	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	7	35.5	96	108	6	8	35.0	39.0	5	12	5	8.5	0
34 FT	15	17	10	8	5	6	5	7	40.8	35.0	35.0	6	16	40.0	44.0	6	16	29.0	30.0	5	6	5	7.5	36.0	97	109	6	8.5	35.0	40.0	5	12	5	8.5	0
36 FT	16	17	10	8	5	6	5	7	40.8	36.0	36.0	6	17	39.0	44.0	6	17	29.0	30.0	5	6	5	7.5	36.0	97	109	6	8	35.0	40.0	5	12	5	8	0
38 FT	16	18	11	8	5	6	5	7	41.5	36.0	36.0	6	16	39.0	44.0	6	16	29.0	30.0	5	6	5	7	36.5	98	110	6	8	35.0	40.0	5	12	5	8.5	0
40 FT	17	18	11	8	5	6	5	7	41.5	37.0	37.0	6	16	39.0	43.0	6	16	29.0	30.0	6	8	5	7	36.5	98	110	6	7.5	35.0	40.0	5	12	5	8	0
42 FT	17	19	11	8	6	8	5	6.5	41.6	37.0		6	16	39.0	43.0	6	16	29.0	30.0	6	8.5	5	7	36.8	99	111	6	7.5	35.0	40.0	5	12	5	7.5	0
44 FT	18	19	12	8	6	8	5	6.5	42.3	38.0	38.0	6	16	39.0	43.0	6	16	29.0	29.0	6	8	5	6.5	37.0	99	111	6	7.5	35.0	40.0	5	12	5	8	0
46 FT	18	20	12	8	6	8	5	6.5	42.4	38.0	38.0	6	15	39.0	43.0	6	15	29.0	29.0	6	8	5	6.5	37.1	100	112	6	7.5	35.0	40.0	5	12	5	7.5	0
48 FT	18	20	12	8	6	7.5	5	6.5	42.4	38.0	38.0	6	15	39.0	43.0	6	15	29.0	29.0	6	7.5	5	6.5	37.1	100	112	6	7	35.0	40.0	5	12	5	7.5	0
50 FT	19	1 21 1	12	IΩ	6 1	7.5	5	1 6	42.5	1 3 9 A	1 39. N	16	15	39.0	l ⊿3.∩	lε	15	28.0	29.0	۱ ۾	R	5	6.5	37.5	1 101	113	6	7 5	35. N	1 40 O	15	12	5	7	Ω



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SPAN (S): 7 FEET HE[GHT (HT): 4 THRU 8 FEET

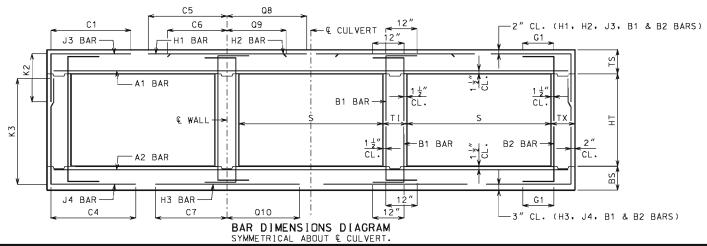
DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 8 OF 27

												CDAN	v (S)	= 7	FT			HE I GH	IT (U)	- \ _	. 0 E	T O	D 10	СТ										
I	_				_										ГІ			HE I UH	н (п	<del></del>	· 3 F	1 0	K 10		OTTOU	CI AD	0.4.0.0				_	117.4.1		20
			IBER KNESS			D.1.D.C.	_					TUP	SLAB							1.0	D.1.D.C				OTTOM	SLAB	BARS				D.4		L BA	
DESIGN	<b>├</b>	IHIU	(INE 5	•	A1	BARS	-	1	J:	BARS		-	H1	BARS		_	H2	BARS		A2	BARS	_			BARS	_	_		BARS		B1	BARS	B2	2 BARS
FILL	TS	BS	ТХ	ΤI	S I ZE	SPA.	SIZE	SPA.	C1		K2  HT=10'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=9'	3 HT=10'	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G1
1 FT	12	9	8	8	5	7.5	5	9	41.1	28.0	32.0	4	16	72.5	54.5	4	16	26.0	27.0	4	8	5	6	60.0	113	125	4	7	58.0	38.0	5	12	5	12 12
2 FT	12	9	8	8	5	7	5	8.5	41.1	28.0	32.0	4	15	72.5	54.5	4	15	25.0	26.0	4	7.5	6	7	63.0	113	125	4	6.5	39.0	38.0	5	12	5	12 12
4 FT	8	9	9	8	4	6	5	6	44.8	24.0	28.0	5	17	75.5	58.0	5	17	23.0	23.0	4	7	5	6	60.8	113	125	4	6	37.0	38.0	5	12	5	11 12
6 FT	8	9	10	8	4	6.5	5	6.5	59.1	24.0	28.0	5	17	45.0	43.0	5	17	22.0	22.0	4	7	5	6.5	56.3	113	125	5	7.5	34.0	37.0	5	12	5	11 12
8 FT	8	9	10	8	4	6.5	5	6.5	50.8	28.0	28.0	5	17	38.0	38.0	5	17	22.0	22.0	4	6.5	5	6	51.8	113	125	5	7	33.0	36.0	5	12	5	10.5 0
10 FT	8	9	10	8	4	6	6	7.5	50.9	28.0	32.0	5	16	36.0	37.0	5	16	23.0	23.0	5	9	6	6.5	52.6	113	125	5	6	33.0	36.0	5	12	5	9.5 0
12 FT	8	10	10	8	4	6	6	6.5	48.5	28.0	32.0	5	15	35.0	36.0	5	15	23.0	24.0	5	8.5	6	7	53.1	114	126	5	6.5	33.0	36.0	5	12	5	9 0
14 FT	9	10	10	8	5	8.5	5	6	46.4	29.0	29.0	5	16	34.0	36.0	5	16	23.0	23.0	5	8	6	7	51.3	114	126	5	6	33.0	36.0	5	12	5	8.5 0
16 FT	9	11	10	8	5	8	5	6	44.8	29.0	29.0	5	15	33.0	35.0	5	15	23.0	24.0	5	7.5	6	7	51.8	115	127	5	6	33.0	36.0	5	12	5	8 0
18 FT	10	12	10	8	5	8	5	6.5	45.3	30.0	30.0	5	15	33.0	35.0	5	15	22.0	23.0	5	7.5	6	7	51.8	116	128	5	6.5	33.0	36.0	5	12	5	8 0
20 FT	11	12	10	8	5	7.5	5	6	46.1	31.0	31.0	5	14	33.0	35.0	5	14	21.0	22.0	5	7	6	6.5	50.8	116	128	5	6	33.0	36.0	5	12	5	8 0
22 FT	11	13	10	8	5	7.5	5	6	45.4	31.0	31.0	5	14	32.0	35.0	5	14	22.0	23.0	5	7	6	6.5	51.4	117	129	5	6	33.0	36.0	5	12	5	8 0
24 FT	12	13	10	8	5	7	5	6	43.4	32.0	32.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6	6	6.5	48.0	117	129	6	8	35.0	39.0	5	12	5	8 0
26 FT	12	14	10	8	5	7	6	7.5	46.1	32.0	36.0	5	13	31.0	35.0	5	13	21.0	22.0	5	6.5	6	7	48.6	118	130	6	8.5	35.0	39.0	5	12	5	8 0
28 FT	13	15	11	8	5	6.5	5	6	43.6	33.0	33.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6.5	5	6.5	45.9	119	131	5	6	32.0	36.0	5	12	5	7.5 0
30 FT	14	15	11	8	5	6.5	5	6	44.3	34.0	34.0	5	12	31.0	35.0	5	12	20.0	21.0	5	6	5	6	45.5	119	131	6	8	35.0	39.0	5	12	5	7.5 0
32 FT	14	16	12	8	5	6.5	5	6	44.1	34.0	34.0	5	12	31.0	34.0	5	12	20.0	21.0	5	6.5	5	6	45.9	120	132	6	8	35.0	40.0	5	12	5	7 0
34 FT	15	17	12	8	5	6.5	5	6	49.6	35.0	35.0	6	17	40.0	43.0	6	17	29.0	30.0	5	6.5	5	6.5	46.5	121	133	6	8	36.0	40.0	5	12	5	7 0
36 FT	15	17	13	8	5	6	5	6	49.6	35.0	35.0	6	16	40.0	43.0	6	16	29.0	30.0	5	6	5	6	46.0	121	133	6	7.5	35.0	40.0	5	12	5	6.5 0
38 FT	16	18	13	8	5	6	6	8.5	54.1	36.0	36.0	6	16	40.0	43.0	6	16	29.0	29.0	5	6	5	6	46.6	122	134	6	8	36.0	40.0	5	12	5	6.5 0
40 FT	16	18	13	8	6	8.5	6	8	54.0	36.0	36.0	6	15	40.0	43.0	6	15	29.0	30.0	5	6	5	6	46.5	122	134	6	7.5	36.0	40.0	5	12	5	6.5 0
42 FT	17	19	14	8	5	6	6	8	54.8	37.0	37.0	6	16	39.0	42.0	6	16	29.0	29.0	5	6	5	6	46.9	123	135	6	7.5	36.0	40.0	5	12	5	6 0
44 FT	17	19	14	8	6	8	6	8	54.6	37.0	37.0	6	15	39.0	42.0	6	15	29.0	29.0	6	8	5	6	46.8	123	135	6	7	36.0	40.0	5	12	5	6 0
46 FT	18	20	14	8	6	8	6	7.5	55.3	38.0	38.0	6	16	39.0	42.0	6	16	28.0	29.0	6	8	5	6	47.3	124	136	6	7.5	36.0	40.0	5	12	5	6 0
48 FT	18	20	15	8	6	7.5	6	8	55.4	38.0	42.0	6	15	39.0	42.0	6	15	28.0	29.0	6	7.5	6	8	50.0	124	136	6	7	36.0	40.0	5	12	6	8.5 0
50 FT	18	21	15	8	6	7	6	7.5	55.4	38.0	42.0	6	14	39.0	42.0	6	14	28.0	29.0	6	8	6	8	50.6	125	137	6	7	36.0	40.0	5	12	6	8 0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 7 FEET THIS SHEET HAB BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 9 THRU 10 FEET

DATE EFFECTIVE: DATE PREPARED:

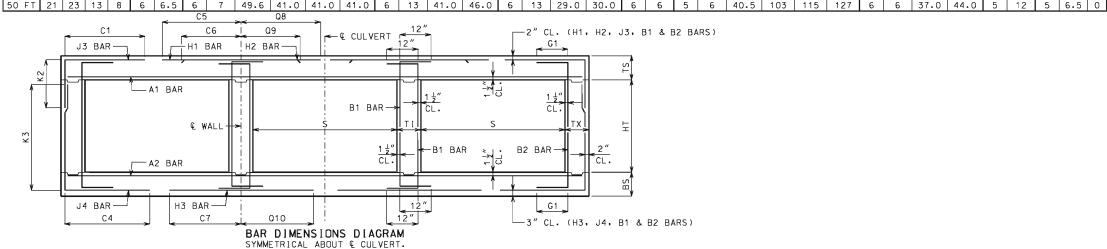
12/01/2011 9/29/2011

703.87

SHEET NO. 9 OF 27

											SPAN	1 (5	) =	8 FT			HEI	GHT (	HT) =	: 4	FT O	₹ 5	FT (	DR 6	FT										
		MEMBE									TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						₩AL	L BAF	₹S
DESIGN	T	HICKN	ESS	A 1	BARS			Jā	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				НЗ	BARS		В1	BARS	B2	BARS
FILL	TS	BS 1	TX TI	SIZE	SPA.	SIZE	SPA.	C1	HT=4'	K2   HT=5'	HT=6′	SIZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=4'	K3 HT=5'	HT=6'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	12	8	8 8	5	7	4	8.5	44.8	28.0	28.0	28.0	4	13	81.5	60.5	4	13	27.0	23.0	4	7.5	4	6.5	42.0	52	64	76	5	7	39.0	40.0	5	12	5	12 12
2 FT	12	8	8 8	5	7	4	8.5	44.8	28.0	28.0	28.0	4	12	81.5	60.5	4	12	26.0	25.0	4	6.5	4	6	38.8	52	64	76	5	6.5	38.0	40.0	5	12	5	12 12
4 FT	8	8	8 8	4	6	5	6	40.6	24.0	24.0	24.0	5	16	50.0	64.0	5	16	27.0	27.0	4	6	4	6	35.4	52	64	76	5	6	38.0	40.0	5	11	5	12 12
6 FT	8	8	8 8	4	6	5	6.5	36.5	28.0	24.0	28.0	5	15	42.0	45.0	5	15	26.0	26.0	5	8.5	5	6.5	33.5	52	64	76	6	7	39.0	41.0	5	12	5	12 12
8 FT	8	9	8 8	4	6	5	6	34.4	24.0	24.0	24.0	5	14	39.0	41.0	5	14	25.0	25.0	5	8	4	6.5	31.9	53	65	77	5	6	36.0	39.0	5	12	5	12 0
10 FT	9	10	8 8	5	8.5	4	6	32.6	25.0	25.0	25.0	5	15	38.0	41.0	5	15	25.0	25.0	5	8	4	7.5	30.5	54	66	78	5	6	35.0	39.0	5	12	5	12 0
12 FT	9	10	8 8	5	8.5	5	6.5	31.6	25.0	25.0	25.0	5	14	37.0	40.0	5	14	24.0	25.0	5	7	4	6.5	29.8	54	66	78	6	7	38.0	42.0	5	12	5	12 0
14 FT	10	11	8 8	5	8	5	7.5	30.5	26.0	26.0	26.0	5	14	36.0	40.0	5	14	24.0	25.0	5	6.5	4	6.5	29.0	55	67	79	5	6	34.0	39.0	5	12	5	12 0
16 FT	11	12	8 8	5	7.5	5	8.5	29.6	27.0	27.0	27.0	5	14	35.0	40.0	5	14	24.0	25.0	5	6.5	4	6.5	28.4	56	68	80	5	6	34.0	39.0	5	12	5	12 0
18 FT	11	13	8 8	5	7.5	5	8	29.5	27.0	27.0	27.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	4	6.5	27.6	57	69	81	6	8	37.0	43.0	5	12	5	12 0
20 FT	12	14	8 8	5	7	5	8.5	28.8	28.0	28.0	28.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	4	6.5	27.3	58	70	82	6	8	36.0	43.0	5	12	5	12 0
22 FT	13	14	8 8	5	6.5	5	8.5	28.1	29.0	29.0	29.0	5	12	34.0	40.0	5	12	23.0	24.0	6	8	4	6	27.4	58	70	82	6	7.5	37.0	43.0	5	12	5	12 0
24 FT	14	15	8 8	5	6	5	8.5	27.9	30.0	30.0	30.0	5	12	34.0	40.0	5	12	22.0	23.0	6	8	4	6	27.3	59	71	83	6	7.5	36.0	43.0	5	12	5	12 0
26 FT	15	16	8 8	6	8.5	5	8	32.6	31.0	31.0	31.0	6	16	42.0	49.0	6	16	30.0	32.0	6	8	4	6	27.3	60	72	84	6	7.5	36.0	43.0	5	12	5	12 0
28 FT	15	16	8 8	6	8	5	8	31.6	31.0	31.0	31.0	6	16	42.0	48.0	6	16	31.0	32.0	6	7.5	4	9	26.1	60	72	84	6	7	36.0	43.0	5	12	5	12 0
30 FT	16	17	8 8	6	8	5	7	31.5	32.0	32.0	32.0	6	15	42.0	48.0	6	15	30.0	31.0	6	7.5	4	9	26.3	61	73	85	6	7	36.0	43.0	5	12	5	12 0
32 FT	16	18	8 8	6	7.5	5	7	31.6	32.0	36.0	36.0	6	15	42.0	48.0	6	15	31.0	32.0	6	7.5	5	6.5	26.1	62	74	86	6	7	36.0	43.0	5	12	5	12 0
34 FT	17	19	8 8	6	7.5	5	6.5	31.6	37.0	37.0	37.0	6	14	42.0	48.0	6	14	30.0	31.0	6	7.5	5	6.5	26.3	63	75	87	6	7	36.0	43.0	5	12	5	11.5 0
36 FT	18	19	8 8	6	7.5	5	6.5	31.5	38.0	38.0	38.0	6	14	42.0	48.0	6	14	30.0	31.0	6	7.5	5	6.5	26.4	63	75	87	6	7	36.0	43.0	5	12	5	10.5 0
38 FT	18	20	8 8	6	7	5	6.5	31.6	38.0	38.0	38.0	6	13	42.0	48.0	6	13	30.0	31.0	6	7.5	5	6	26.4	64	76	88	6	7	36.0	43.0	5	12	5	10 0
40 FT	19	20	8 8	6	7	5	6	31.6	39.0	39.0	39.0	6	13	42.0	48.0	6	13	29.0	31.0	6	6.5	5	6	26.5	64	76	88	6	6.5	36.0	43.0	5	12	5	9.5 0
42 FT	19	21	8 8	6	6	5	6	31.8	39.0	39.0	39.0	6	12	42.0	48.0	6	12	30.0	31.0	6	7	6	7.5	29.6	65	77	89	6	6.5	36.0	43.0	5	12	5	9.5 0
44 FT	20	22	8 8	6	6.5	6	7.5	35.9	44.0	44.0	44.0	6	13	41.0	48.0	6	13	29.0	30.0	6	7	6	7	29.8	66	78	90	6	6.5	36.0	43.0	5	12	5	9.5 0
46 FT	21	22	8 8	6	6.5	6	7	35.8	45.0	45.0	45.0	6	13	41.0	48.0	6	13	29.0	30.0	6	6.5	6	7	29.9	66	78	90	6	6.5	36.0	43.0	5	12	5	9.5 0
48 FT	21	23	8 8	6	6.5	6	7	36.0	45.0	45.0	45.0	6	13	41.0	48.0	6	13	29.0	30.0	6	7	6	6.5	30.0	67	79	91	6	6.5	36.0	43.0	5	12	5	9.5 0
50 FT	22	23	8 8	6	6.5	6	6.5	35.9	46.0	46.0	46.0	6	13	41.0	47.0	6	13	29.0	30.0	6	6.5	6	6.5	30.1	67	79	91	6	6	36.0	43.0	5	12	5	9 0

	•	•	•				•	•	•	•	SPAI	V (S	) =	8 FT	•		HEI	GHT (	HT) =	= 7	FT O	R 8	FT (	OR 9	FT	, and the second	•	•	·	·	•					
		MEMBER									TOP SL	AB B												E	BOTTOM	SLAB I	BARS						WAL	L BA		
DESIGN	T	HICKNE	SS	A1 BAF	₹S			J3	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	B2	2 BARS	Ŝ
FILL	TS	BS TX	TI	SIZE SP	A. S	SIZE	SPA.	C1	HT=7'	K2 HT=8'	HT=9'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	K3 HT=8′	HT=9'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	12	9 8	8	5	7	4	6	44.8	28.0	28.0	28.0	4	13	81.5	60.5	4	13	27.0	25.0	4	7.5	4	6	66.0	89	101	113	5	8	41.0	41.0	5	12	5	12	12
2 FT	12	9 8	8	5	7	4	6	44.8	28.0	28.0	28.0	4	12	81.5	60.5	4	12	26.0	24.0	4	6.5	5	6.5	61.3	89	101	113	5	7.5	39.0	41.0	5	12	5	12	12
4 FT	8	8 8	8	4 6	5	6	7.5	47.8	28.0	32.0	32.0	5	16	83.5	64.0	5	16	27.0	28.0	5	8.5	6	6	55.0	88	100	112	5	6	38.0	40.0	5	12	5	12	12
6 FT	8	9 8	8	4 6	5	6	7.5	52.5	24.0	28.0	32.0	5	15	44.0	47.0	5	15	26.0	26.0	5	8.5	6	6.5	52.3	89	101	113	5	6.5	37.0	40.0	5	12	5	12	12
8 FT	8	9 8	8	4 6	5	6	7.5	47.4	24.0	28.0	32.0	5	14	40.0	42.0	5	14	25.0	25.0	5	7.5	6	6	48.1	89	101	113	5	6	36.0	39.0	5	12	5	11.5	0
10 FT	9	10 8	8	5 8	. 5	6	7	46.3	25.0	29.0	33.0	5	15	39.0	41.0	5	15	25.0	25.0	5	7.5	6	6.5	46.9	90	102	114	5	6	35.0	39.0	5	12	5	11	0
12 FT	9	10 8	8	5 8	. 5	6	7	44.8	29.0	33.0	33.0	5	14	37.0	40.0	5	14	24.0	25.0	5	6.5	6	6	45.4	90	102	114	6	7	38.0	42.0	5	12	5	10	0
14 FT	10	11 8	8	5 8	3	6	6.5	44.1	30.0	30.0	34.0	5	14	37.0	40.0	5	14	24.0	25.0	5	6.5	6	6	44.9	91	103	115	5	6	35.0	39.0	5	12	5	9.5	0
16 FT	11	12 8	8	5 7.	. 5	6	6.5	43.6	31.0	31.0	35.0	5	14	36.0	40.0	5	14	24.0	25.0	5	6.5	6	6.5	44.4	92	104	116	5	6	34.0	39.0	5	12	5	9.5	0
18 FT	11	13 8	8	5 7.	. 5	6	6	42.8	31.0	31.0	35.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	6	6.5	43.9	93	105	117	6	8	37.0	43.0	5	12	5	9.5	0
20 FT	12	14 8	8	5	7	6	6	42.4	32.0	32.0	36.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6	6	6.5	43.4	94	106	118	6	8	37.0	43.0	5	12	5	9.5	0
22 FT	13	14 8	8	5 6	. 5	6	6	42.1	33.0	33.0	37.0	5	12	35.0	39.0	5	12	23.0	24.0	6	8	6	6	43.0	94	106	118	6	7.5	37.0	43.0	5	12	5	9	0
24 FT	14	15 10	8	5 6	ŝ	5	6.5	40.0	34.0	34.0	34.0	5	12	34.0	39.0	5	12	22.0	23.0	6	8.5	5	7	40.4	95	107	119	6	7	37.0	43.0	5	12	5	8	0
26 FT	14	16 10	8	5 6	5	5	6	39.8	34.0	34.0	34.0	5	12	34.0	39.0	5	12	22.0	24.0	6	8	5	7	40.4	96	108	120	6	7.5	37.0	43.0	5	12	5	8	0
28 FT	15	16 10	8	6 8	3	5	6.5	43.0	35.0	35.0	35.0	6	16	42.0	48.0	6	16	30.0	32.0	6	7.5	5	7	38.4	96	108	120	6	7	37.0	43.0	5	12	5	8	0
30 FT	15	17   11	8	6 7.	. 5	5	6.5	43.5	31.0	35.0	35.0	6	15	42.0	47.0	6	15	31.0	32.0	6	8	5	7	38.8	97	109	121	6	7	37.0	43.0	5	12	5	8.5	0
32 FT	16	18 11	8	6 8	3	5	6	43.8	32.0	36.0	36.0	6	15	42.0	47.0	6	15	30.0	32.0	6	8	5	7	39.0	98	110	122	6	7	37.0	43.0	5	12	5	8	0
34 FT	17	19 11	8	6 7.	. 5	5	6	43.9	33.0		37.0	6	14	42.0	47.0	6	14	30.0	31.0	6	8	5	7	39.3	99	111	123	6	7	37.0	43.0	5	12	5	7.5	0
36 FT	17	19 12	8	6	7	5	6	44.4	33.0	37.0	37.0	6	14	42.0	47.0	6	14	30.0	31.0		7.5	5	6.5	39.3	99	111	123	6	6.5	37.0	43.0	5	12	5	8	0
38 FT	18	20 12	8	6 7	. 5	5	6	44.6	38.0	38.0	38.0	6	13	42.0	47.0	6	13	29.0	31.0	6	7.5	5	6.5	39.6	100	112	124	6	6.5	37.0	43.0	5	12	5	7.5	0
40 FT	19	20 12	8	6	7	5	6	44.6	39.0	39.0	39.0	6	14	42.0	47.0	6	14	29.0	30.0	6	6.5	5	6.5	39.6	100	112	124	6	6.5	37.0	43.0	5	12	5	7	0
42 FT	19	21 12	8	6	7	6	7.5	48.8	39.0	39.0	39.0	6	13	42.0	47.0	6	13	29.0	30.0	6	7	5	6.5	39.8	101	113	125	6	6.5	37.0	43.0	5	12	5	7	0
44 FT	20	22 13	8	6	7	5	6	45.5	40.0	40.0	40.0	6	14	41.0	46.0	6	14	29.0	30.0	6	7	5	6	40.3	102	114	126	6	6.5	37.0	44.0	5	12	5	7	0
46 FT	20	22 13	8	6 6	. 5	6	8	49.5	40.0	40.0	40.0	6	13	41.0	46.0	6	13	29.0	30.0	6	7	5	6	40.3	102	114	126	6	6	37.0	44.0	5	12	5	6.5	0
48 FT	21	23 13		6 6	_	6	8	49.6	41.0		41.0	6	13	41.0	46.0	6	13	29.0	30.0	6	7	5	6	40.5	103	115	127	6	6.5	37.0	44.0	5	12	5	6.5	0
50 FT	21	23 13	B	6 6	. 5	6	7	19 6	41.0	41.0	41.0	6	13	41.0	160	1 6	13	29.0	30 0	6	6	5	6	40.5	103	115	127	6	6	37 0	44.0	1 5	12	5	6.5	0



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CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

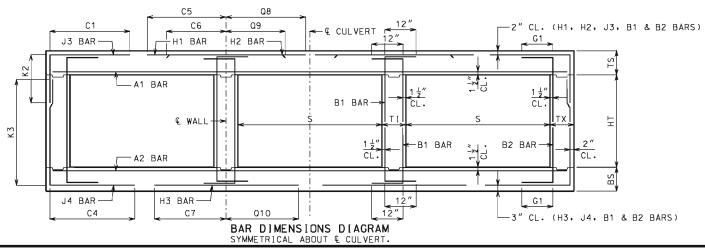
SPAN (S): 8 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 4 THRU 9 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011 703.87

SHEET NO. 10 OF 27

DESIGN TH TS E 1 FT 12 2 FT 12 4 FT 8 6 FT 8 8 10 FT 8 12 FT 9 14 FT 10 16 FT 10 18 FT 11	MEMBER HICKNE BS T> 9 8 9 9 9 10	SS		BARS			.13			TOP S	SLAB I	2485																		100.4.1		
FILL TS E  1 FT 12 2 FT 12 4 FT 8 6 FT 8 8 FT 8 10 FT 8 12 FT 9 14 FT 10 16 FT 10 18 FT 11	BS T> 9 8 9 9						.13					כווחכ										В	OTTOM	SLAB E	BARS					WAL	L BAF	₹S
1 FT 12 2 FT 12 4 FT 8 6 FT 8 8 FT 8 10 FT 8 12 FT 9 14 FT 10 16 FT 10	9 8	ΧTΙ	S 1 7 F				0.3	BARS			H1	BARS			H2	BARS		A2 I	BARS			J4	BARS			Н3	BARS		В1	BARS	В2	BARS
2 FT 12 4 FT 8 6 FT 8 8 FT 8 10 FT 8 12 FT 9 14 FT 10 16 FT 10 18 FT 11	9 9		3122	SPA.	SIZE	SPA.	C1	HT=10'		SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K: HT=10'H		SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G1
4 FT 8 6 FT 8 8 FT 8 10 FT 8 12 FT 9 14 FT 10 16 FT 10 18 FT 11		9	5	7	5	7	44.9	32.0	32.0	4	13	81.5	61.5	4	13	28.0	26.0	4	6.5	6	6	69.3	125	137	5	7.5	43.0	42.0	5	11.5	5	10 12
6 FT 8 8 8 FT 8 10 FT 8 12 FT 9 14 FT 10 18 FT 11	9 10	9	5	7	5	8	45.5	32.0	32.0	4	12	82.5	61.5	4	12	27.0	24.0	4	6.5	6	6.5	70.0	125	137	5	7	41.0	41.0	5	11.5	5	10.5 12
8 FT 8 10 FT 8 12 FT 9 14 FT 10 16 FT 10 18 FT 11		) 9	4	6	6	7	49.1	28.0	28.0	5	16	84.5	65.0	5	16	27.0	27.0	4	6	5	6	65.8	125	137	5	7	39.0	41.0	5	11.5	5	9.5 12
10 FT 8 12 FT 9 14 FT 10 16 FT 10 18 FT 11	9 1	1 9	4	6	5	6	57.1	28.0	28.0	5	16	44.0	44.0	5	16	26.0	26.0	5	9	5	6	56.6	125	137	5	6.5	37.0	39.0	5	11.5	5	9.5 12
12 FT 9 14 FT 10 16 FT 10 18 FT 11	10 1	1 9	4	6	6	7	54.8	28.0	28.0	5	15	41.0	41.0	5	15	25.0	26.0	5	9	5	6.5	56.4	126	138	5	6.5	37.0	39.0	5	12	5	9 0
14 FT 10 16 FT 10 18 FT 11	10 1	1 9	4	6	6	6.5	51.9	28.0	28.0	5	14	39.0	40.0	5	14	25.0	25.0	5	7.5	5	6	54.0	126	138	5	6	36.0	39.0	5	12	5	8.5 0
16 FT 10 11 18 FT 11 1	11 11	1 9	5	8.5	6	7	52.5	29.0	29.0	5	14	38.0	39.0	5	14	25.0	25.0	5	7.5	5	6	53.9	127	139	5	6	36.0	39.0	5	12	5	8 0
18 FT 11	11 1	1 9	5	8	5	6	50.1	30.0	30.0	5	15	37.0	39.0	5	15	25.0	25.0	5	7	5	6	51.9	127	139	5	6	35.0	39.0	5	12	5	7.5 0
	12 1	1 9	5	7.5	5	6	48.3	30.0	30.0	5	13	36.0	39.0	5	13	24.0	25.0	5	6.5	5	6	52.3	128	140	5	6	35.0	39.0	5	12	5	7.5 0
20 FT 12 '	13 11	1 9	5	7.5	5	6.5	48.6	31.0	31.0	5	14	36.0	39.0	5	14	24.0	25.0	5	6.5	6	7	55.0	129	141	6	8	38.0	42.0	5	12	5	7.5 0
120 1 12 1	14 1	1 9	5	7	5	6	48.8	32.0	32.0	5	13	35.0	39.0	5	13	24.0	25.0	5	6.5	6	7	54.9	130	142	6	8	38.0	43.0	5	12	5	7.5 0
22 FT 13 '	15 11	1 9	5	6.5	6	8	52.1	33.0	37.0	5	12	35.0	39.0	5	12	23.0	24.0	5	6	6	7	54.9	131	143	6	8	38.0	43.0	5	12	5	7.5 0
24 FT 13 '	15 12	2 9	5	6.5	5	6	48.3	33.0	33.0	5	12	35.0	38.0	5	12	23.0	25.0	5	6	6	7.5	53.9	131	143	6	7	38.0	43.0	5	12	5	7 0
26 FT 14 '	16 12	2 9	5	6	6	8	51.8	34.0	38.0	5	12	35.0	38.0	5	12	22.0	24.0	5	6	6	7.5	54.1	132	144	6	7.5	38.0	43.0	5	12	5	7 0
28 FT 15 '	16 12	2 9	5	6	6	8	56.1	35.0	39.0	6	16	43.0	47.0	6	16	31.0	32.0	6	7.5	6	8	51.0	132	144	6	7	38.0	43.0	5	12	5	7 0
30 FT 15 '	17 12	2 9	6	8	6	7	55.9	35.0	39.0	6	16	43.0	47.0	6	16	31.0	32.0	6	8	6	7.5	51.5	133	145	6	7	38.0	43.0	5	12	5	7 0
32 FT 16	18 13	3 9	6	8	6	8	56.5	36.0	40.0	6	15	42.0	47.0	6	15	30.0	31.0	6	8	6	8.5	51.8	134	146	6	7	38.0	43.0	5	12	5	6.5 0
34 FT 17	19 13	3 9	6	8	6	7.5	56.9	37.0	41.0	6	14	42.0	47.0	6	14	30.0	31.0	6	8	6	8.5	52.3	135	147	6	7	38.0	43.0	5	12	5	6.5 0
36 FT 17	19 14	4 9	6	7.5	6	7.5	57.0	37.0	41.0	6	14	42.0	46.0	6	14	30.0	31.0	6	7.5	6	8	51.9	135	147	6	6.5	38.0	43.0	5	12	5	6 0
38 FT 18 2	20 14	4 9	6	7.5	6	7.5	57.4	38.0	42.0	6	14	42.0	46.0	6	14	30.0	31.0	6	7.5	6	8	52.3	136	148	6	7	38.0	43.0	5	12	5	6 0
40 FT 18 2	20 14	4 9	6	7	6	6.5	57.3	38.0	42.0	6	13	42.0	46.0	6	13	30.0	31.0	6	6.5	6	8	52.1	136	148	6	6.5	38.0	43.0	5	12	5	6 0
42 FT 19 :	21 15	5 9	6	7	6	7	57.9	43.0	43.0	6	14	42.0	46.0	6	14	30.0	30.0	6	7	6	8	52.6	137	149	6	6.5	38.0	43.0	5	12	6	8 0
44 FT 19 2	22 15	5 9	6	7	6	7	57.9	43.0	43.0	6	13	42.0	46.0	6	13	30.0	30.0	6	7	6	8	53.0	138	150	6	6.5	38.0	43.0	5	12	6	8 0
46 FT 20 2	22 15	5 9	6	7	6	6	58.1	44.0	44.0	6	14	42.0	45.0	6	14	30.0	30.0	6	7	6	7.5	52.9	138	150	6	6.5	38.0	43.0	5	12	6	8 0
48 FT 20 2	' ~													_																_	_	
50 FT 21 2	23 16	6 9	6	6.5	6	7	58.5	44.0	44.0	6	13	42.0	45.0	6	13	30.0	30.0	6	7	6	7.5	53.3	139	151	6	6.5	38.0	44.0	5	12	6	8 0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET HE[GHT (HT): 10 THRU 11 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

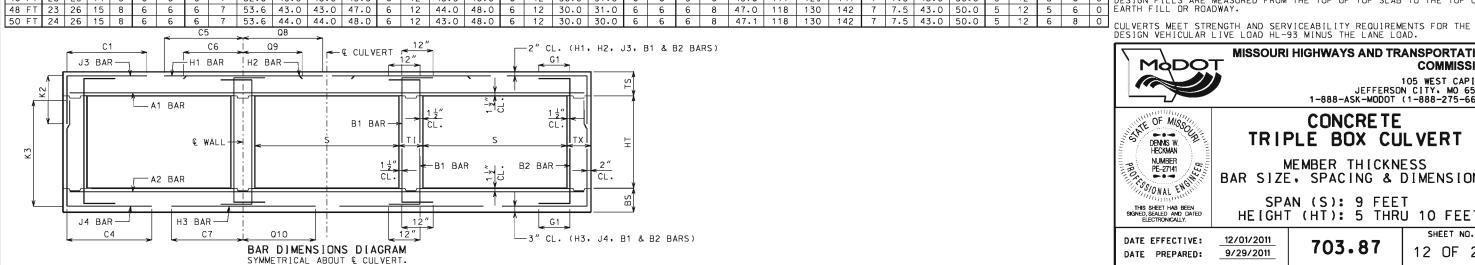
703.87

SHEET NO. 11 OF 27

	C1 J3 BAR		C5 C6 H1 BAR	  -   H	Q8 Q9 2 BAR	r—€ CULVER i	12"		2" CL. (F	1. H2.	J3, B1	1 & B2 BARS	5)
K3		- A1	€ ₩ALL-	<u> </u>	*	B1 BAR	TI BAR	1 ½ " S 1 ½ " CL.	1½" CL. T	2" CL.	HT TS		
V		_		4	<del></del>	i		î_	<u> </u>	_	BS		
•	J4 BAR — C4	*	H3 BAR —	- - -	010		12"		G1 -3" CL. (H	3, J4,	<b>,</b> B1 & E	32 BARS)	
					AR DIMENSI								

											SPAN	1 (5	) =	9 FT			HEI	GHT (	HT) =	5 I	FT O	R 6	FT (	DR 7 I	FT										
		MEMBI	ER								TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						₩AL	L BA	RS
DESIGN	Т	HICKN	ESS	A1	BARS			J.	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				H3	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS .	тх т	SIZ	E SPA.	SIZE	SPA.	C1	HT=5'	K2   HT=6'	HT=7′	SIZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=5'	K3 HT=6'	HT=7'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	13	8	8 8	5	6.5	4	7.5	48.3	29.0	29.0	29.0	4	12	89.5	66.5	4	12	28.0	26.0	4	6.5	5	6	46.1	64	76	88	5	6	42.0	43.0	5	12	5	12 12
2 FT	13	9	8 8	5	6.5	4	7.5	48.3	29.0	29.0	29.0	5	17	89.5	68.5	5	17	27.0	27.0	4	6.5	4	6	43.9	65	77	89	5	6.5	41.0	43.0	5	12	5	12 12
4 FT	9	9	8 8	5	8.5	5	6.5	44.8	25.0	25.0	25.0	5	16	57.0	70.0	5	16	29.0	29.0	5	8.5	4	6	39.6	65	77	89	5	6	40.0	43.0	5	12	5	12 12
6 FT	9	9	8 8	5	8.5	5	6.5	39.6	25.0	25.0	29.0	5	15	46.0	52.0	5	15	27.0	28.0	5	7.5	5	6.5	36.5	65	77	89	6	7	42.0	45.0	5	12	5	12 12
8 FT	9	10	8 8	5	8.5	5	6.5	36.8	25.0	25.0	25.0	5	14	42.0	45.0	5	14	26.0	27.0	5	7.5	4	6.5	34.8	66	78	90	5	6	38.0	42.0	5	12	5	12 0
10 FT	9	10	8 8	5	8.5	5	6	35.4	25.0	25.0	29.0	5	12	41.0	44.0	5	12	26.0	26.0	5	7	5	7	33.5	66	78	90	6	6.5	41.0	45.0	5	12	5	12 0
12 FT	10	11	8 8	5	8	5	7	33.9	26.0	26.0	30.0	5	12	40.0	44.0	5	12	26.0	26.0	5	6.5	5	7.5	32.4	67	79	91	6	7	40.0	45.0	5	12	5	12 0
14 FT	11	12	8 8	5	7.5	5	7.5	32.8	27.0	27.0	31.0	5	13	39.0	43.0	5	13	25.0	26.0	5	6	5	8.5	31.6	68	80	92	6	7	40.0	46.0	5	12	5	12 0
16 FT	12	13	8 8	5	7	5	8	31.9	28.0	28.0	32.0	5	13	38.0	43.0	5	13	25.0	27.0	5	6	5	8.5	31.0	69	81	93	6	7	39.0	46.0	5	12	5	12 0
18 FT	13	14	8 8	5	6.5	5	8	31.3	29.0	29.0	33.0	5	12	37.0	43.0	5	12	25.0	26.0	6	8	5	8.5	30.6	70	82	94	6	7.5	39.0	46.0	5	12	5	12 0
20 FT	14	15	8 8	5	6	5	8.5	30.6	30.0	30.0	34.0	5	12	37.0	43.0	5	12	24.0	26.0	6	8	5	8.5	30.3	71	83	95	6	7	39.0	46.0	5	12	5	12 0
22 FT	15	16	8 8	6	8	5	8	35.3	31.0	31.0	35.0	6	16	45.0	52.0	6	16	32.0	34.0	6	7.5	5	8	30.0	72	84	96	6	7	39.0	46.0	5	12	5	12 0
24 FT	15	16	8 8	6	8	5	7.5	35.0	31.0	35.0	35.0	6	16	45.0	52.0	6	16	33.0	35.0	6	6.5	5	8	29.8	72	84	96	6	6.5	39.0	46.0	5	12	5	11.5 0
26 FT	16	17	8 8	6	8	5	7	34.9	32.0	36.0	36.0	6	15	45.0	52.0	6	15	32.0	34.0	6	7	5	7	29.8	73	85	97	6	6.5	39.0	46.0	5	12	5	10.5 0
28 FT	17	18	8 8	6	7.5	5	6.5	34.8	37.0	37.0	37.0	6	14	45.0	52.0	6	14	32.0	34.0	6	7	5	6.5	29.8	74	86	98	6	6.5	39.0	46.0	5	12	5	9.5 0
30 FT	18	19	8 8	6	7	5	6.5	33.6	38.0	38.0	38.0	6	13	44.0	52.0	6	13	31.0	32.0	6	7	5	6.5	28.8	75	87	99	6	6	39.0	46.0	5	12	5	9.5 0
32 FT	18	20	8 8	6	7	5	6.5	33.8	38.0	38.0	38.0	6	13	44.0	51.0	6	13	32.0	33.0	6	7	5	6	28.8	76	88	100	6	6.5	39.0	46.0	5	12	5	9.5 0
34 FT	19	20	8 8	6	6.5	5	6	33.6	39.0	39.0	39.0	6	13	44.0	51.0	6	13	31.0	33.0	6	6	5	6	28.9	76	88	100	6	6	39.0	46.0	5	12	5	9.5 0
36 FT	20	21	8 8	6	6.5	6	7.5	37.8	44.0	44.0	44.0	6	12	44.0	51.0	6	12	30.0	32.0	6	6.5	6	7.5	32.0	77	89	101	6	6	39.0	46.0	5	12	5	9.5 0
38 FT	20	22	8 8	6	6	6	7.5	37.9	44.0	44.0	44.0	6	12	44.0	51.0	6	12	31.0	32.0	6	6.5	6	7	32.0	78	90	102	6	6	39.0	46.0	5	12	5	9 0
40 FT	21	23	8 8	6	6	6	7	38.0	45.0	45.0	45.0	6	12	44.0	51.0	6	12	30.0	32.0	6	6.5	6	6.5	32.3	79	91	103	6	6	39.0	46.0	5	12	5	8.5 0
42 FT	22	23	8 8	6	6	6	6.5	37.9	46.0	46.0	46.0	6	12	44.0	51.0	6	12	30.0	31.0	6	6	6	6.5	32.3	79	91	103	7	8	42.0	49.0	5	12	5	8 0
44 FT	23	24	9 8	6	6	6	7	38.8	47.0	47.0	47.0	6	12	44.0	50.0	6	12	30.0	31.0	6	6	6	7	33.0	80	92	104	7	8	42.0	50.0	5	12	5	8.5 0
46 FT	23	25	9 8	7	8	6	7	38.9	47.0	47.0	47.0	7	16	49.0	55.0	7	16	35.0	36.0	6	6	6	7	33.0	81	93	105	7	8	42.0	50.0	5	12	5	8.5 0
48 FT	24	25	9 8	7	8	6	7	38.9	48.0	48.0	48.0	6	12	43.0	50.0	6	12	30.0	31.0	6	6	6	7	33.1	81	93	105	7	7.5	42.0	50.0	5	12	5	8 0
50 FT	24	26	9 8	7	7.5	6	6.5	39.0	48.0	48.0	48.0	7	15	48.0	55.0	7	15	35.0	36.0	6	6	6	6.5	33.3	82	94	106	7	7.5	42.0	50.0	5	12	5	7.5 0

											SPAN	(5)	= 9	FT			HEIG	HT (H	IT) =	8 F	T OR	9 F	T OF	R 10 I	FT											
		MBER									TOP SL	AB B	ARS											В	BOTTOM	SLAB I	BARS						₩AL	L BA	4RS	
SIGN	THI	CKNES	S	Α1	BARS			J3	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	В	2 BAR	₹S
1111	s Bs	тх	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2	HT=10'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	uт—q ′	K3 HT=9′	UT-101	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	. 0
FT 1	7 0	ο	Ω	5	6.5	5	8.5	48.3	29.0	29.0	33.0	1	12	89.5	66.5	1 1	12	29.0	27.0	4	6.5	6	6.5	75.0	101	113	125	5	7	43.0	44.0	+-	12	-	12	+
FT 1		8	8	5	6.5	5	8.5	51.3	29.0	33.0	33.0	5	18	91.5	68.5	5	18	28.0	25.0	5	9	6	6.5		101	113	125	5	6.5	42.0	44.0	片	12	15	11.5	
	9	8	8	5	8.5	16	7	51.3	29.0	33.0	33.0	5	16	91.5	70.0	5	16	29.0	30.0	5	8	6	6	62.0	101	113	125	5	6	41.0	44.0	一	12	5	10	1
FT 9		9	8	5	8.5	5	6	54.9	25.0	25.0	29.0	5	15	49.0	53.0	5	15	27.0	28.0	5	B	5	6	53.9	102	114	126	5	6.5	39.0	43.0	一	12	+5	11	-
FT 9			8	5	8.5	5	6	48.8	25.0	29.0	29.0	5	14	44.0		5	14	26.0	27.0	5	7	6	6.5	52.4	102	114	126	6	7	41.0	46.0	一	12	5	10.5	-
FT 9			8	5	8.5	5	6	46.5	25.0	29.0	29.0	5	12	42.0	44.0	5	12	26.0	26.0	5	6.5	6	7	51.4	103	115	127	5	6	38.0	43.0	15	12	5	9.5	_
FT 10			8	5	8	5	6	45.8	30.0	30.0	30.0	5	13	40.0	43.0	15	13	26.0	27.0	5	6.5	6	6	49.5	103	115	127	6	7	40.0	45.0	+=	12	15	9	-
FT 1			8	5	7.5	6	7	48.1		31.0		5	13	39.0	43.0	5	13	25.0	27.0	5	6	6	6.5	48.8	104	116	128	6	7	40.0	46.0	15	12	15	8.5	
FT 1:			8	5	7	6	6.5	47.4	32.0	32.0	36.0	5	13	39.0	43.0	5	13	25.0	27.0	5	6	6	6.5	48.3	105	117	129	6	7	40.0	46.0	<del>  5</del>	12	5	8.5	-
FT 1.			8	5	6.5	6	7	46.9	33.0	33.0	37.0	5	12	38.0	43.0	5	12	24.0	26.0	6	8	6	6.5	47.6	106	118	130	6	7.5	40.0	46.0	<del>  5</del>	12	5	8.5	
FT 1	_	9	8	5	6.5	6	6	46.0	33.0	33.0	37.0	5	12	38.0	43.0	5	12	25.0	27.0	6	8	6	6.5	47.1	107	119	131	6	7	40.0	46.0	15	12	5	8.5	
FT 1		11	8	5	6	5	6	43.5	34.0	34.0	34.0	5	12	37.0	42.0	5	12	25.0	26.0	6	7.5	5	7	44.0	108	120	132	6	7	40.0	46.0	5	12	5	8	-
FT 1:	_		-	6	8	5	6	48.4	35.0	35.0	35.0	6	16	46.0	51.0	6	16	33.0	35.0	6	7.5	5	7	44.0	109	121	133	6	6.5	40.0	46.0	5	12	5	7.5	
FT 1		11		6	8	6	8	52.1		36.0	-	6	15	45.0	51.0	6	15	32.0	34.0	6	6.5	5	6	43.6	109	121	133	6	6.5	40.0	46.0	5	12	5	7.5	_
FT 1	7 18	12	8	6	7.5	5	6	48.8	37.0	37.0		6	14	45.0	51.0	6	14	31.0	33.0	6	7	5	6.5	43.9	110	122	134	6	6.5	40.0	46.0	5	12	5	7	
FT 1	7 19	12	8	6	7.5	5	6	46.9	37.0	37.0	37.0	6	14	44.0	51.0	6	14	32.0	33.0	6	7	5	6.5	42.0	111	123	135	6	6	40.0	47.0	5	12	5	7.5	5
FT 1	3 20	12	8	6	7	6	8	51.0	38.0	38.0	38.0	6	13	44.0	50.0	6	13	31.0	33.0	6	7	5	6.5	42.3	112	124	136	6	6	40.0	47.0	5	12	5	7	
FT 1	3 20	12	8	6	7	6	8	50.9	39.0	39.0	39.0	6	13	44.0	50.0	6	13	30.0	32.0	6	6	5	6.5	42.3	112	124	136	6	6	40.0	47.0	5	12	5	7	
FT 1	3 21	13	8	6	6.5	6	8	51.6	39.0	39.0	39.0	6	13	44.0	50.0	6	13	31.0	32.0	6	6.5	5	6	42.5	113	125	137	6	6	40.0	47.0	5	12	5	7	_
FT 2	) 22	13	8	6	6.5	6	7.5	51.8	40.0	40.0	40.0	6	12	44.0	50.0	6	12	30.0	31.0	6	6.5	5	6	42.8	114	126	138	6	6	40.0	47.0	5	12	5	6.5	,
FT 2	1 23	13	8	6	6.5	6	7.5	51.9	41.0	41.0	41.0	6	12	44.0	49.0	6	12	30.0	31.0	6	6.5	5	6	43.0	115	127	139	6	6	40.0	47.0	5	12	5	6.5	
FT 2	1 24	14	8	6	6	6	7.5	52.6	41.0	41.0	41.0	6	12	44.0	49.0	6	12	30.0	31.0	6	6.5	5	6	43.4	116	128	140	6	6	40.0	47.0	5	12	5	6.5	
FT 2:	2 24	14	8	6	6	6	7.5	52.6	42.0	42.0	42.0	6	12	44.0	49.0	6	12	30.0	31.0	6	6	5	6	43.4	116	128	140	7	7.5	43.0	50.0	5	12	5	6	
FT 2.	3 25	14	8	6	6	6	7	52.8	43.0	43.0	43.0	6	12	43.0	48.0	6	12	30.0	31.0	6	6	5	6	43.6	117	129	141	7	7.5	43.0	50.0	5	12	5	6	
FT 2				6	6	6	7	53.6	43.0	43.0	47.0	6	12	44.0	48.0	6	12	30.0	31.0	6	6	6	8	47.0	118	130	142	7	7.5	43.0	50.0	5	12	5	6	
ET 2	1 26	1.5	0	c	6	6	7	63 C	44.0	44.0	48 0	6	12	43 O	40 0	-	12	30.0	30.0	c	6	6	Ω	17 1	110	130	1.42	7	7.5	130	50.0		12	6	Ω	



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY• MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SPAN (S): 9 FEET HE[GHT (HT): 5 THRU 10 FEET

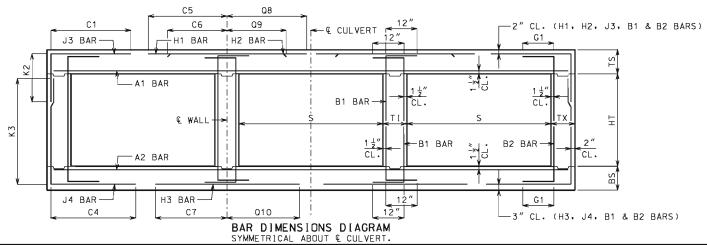
DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 12 OF 27

												SPAN	(S)	= 9	FT			HE I GH	T (HI	`) =	11	FT (	OR 12	2 FT											
		MEM										TOP :	SLAB I	BARS										В	MOTTO	SLAB E	BARS					WAL	L BAR	S	
DESIGN		THICK	(NES	S	A1	BARS			Jā	BARS			H1	BARS		L	H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1	BARS	B2	BARS	_
FILL	TS	BS	TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		(2 'HT=12 <i>'</i>	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K HT=11'	3 HT=12′	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA.	G1
1 FT	13	9	9	10	5	6.5	5	7.5	49.3	33.0	33.0	4	12	90.5	67.5	4	12	29.0	27.0	4	6	6	6	76.3	137	149	5	6.5	44.0	44.0	5	10	5	9	12
2 FT	13	10	9	10	5	6.5	5	7	52.3	33.0	33.0	5	18	92.5	69.5	5	18	28.0	25.0	4	6	6	6.5	76.3	138	150	5	7	44.0	45.0	5	11.5	5	9	12
4 FT	9	10	9	10	5	8.5	5	6	52.3	29.0	29.0	5	16	92.5	71.0	5	16	29.0	30.0	5	8.5	6	6	76.3	138	150	5	7	43.0	45.0	5	11.5	5	8.5	12
6 FT	9	10	10	10	5	8.5	5	6	69.4	29.0	29.0	5	16	51.0	49.0	5	16	28.0	28.0	5	7.5	6	6.5	68.8	138	150	5	6	41.0	43.0	5	12	5	8	12
8 FT	9	10	10	10	5	8.5	5	6	60.0	29.0	29.0	5	14	45.0	45.0	5	14	27.0	27.0	5	7	6	6	63.9	138	150	6	7	43.0	45.0	5	12	5	8	0
10 FT	9	11	10	10	5	8.5	6	7	59.0	29.0	33.0	5	13	42.0	43.0	5	13	27.0	27.0	5	6.5	6	6	63.6	139	151	5	6	39.0	43.0	5	12	5	8	0
12 FT	10	12	10	10	5	8	6	7	58.6	30.0	34.0	5	13	41.0	43.0	5	13	26.0	27.0	5	6.5	6	6.5	62.8	140	152	5	6	39.0	43.0	5	12	5	8	0
14 FT	11	12	10	10	5	7.5	6	7.5	58.5	31.0	35.0	5	13	41.0	43.0	5	13	26.0	27.0	5	6	6	6	60.4	140	152	6	7	41.0	45.0	5	12	5	8	0
16 FT	12	13	11	10	5	7	5	6	54.4	32.0	32.0	5	13	40.0	42.0	5	13	26.0	27.0	5	6	6	7	59.1	141	153	6	7	41.0	45.0	5	12	5	7.5	0
18 FT	12	14	11	10	5	7	6	7.5	55.6	32.0	36.0	5	12	39.0	42.0	5	12	26.0	27.0	6	8	6	6.5	59.0	142	154	6	7.5	41.0	46.0	5	12	5	7.5	0
20 FT	13	15	12	10	5	6.5	6	8	55.0	33.0	37.0	5	12	38.0	42.0	5	12	26.0	27.0	6	8	6	7	58.1	143	155	6	7	41.0	46.0	5	12	5	7	0
22 FT	14	16	12	10	5	6	6	7.5	55.0	34.0	38.0	5	12	38.0	42.0	5	12	25.0	27.0	6	7.5	6	7	57.9	144	156	6	7	41.0	46.0	5	12	5	7	0
24 FT	15	17	13	10	6	8	6	7.5	61.0	35.0	39.0	6	16	47.0	51.0	6	16	33.0	35.0	6	7.5	6	7.5	57.4	145	157	6	6.5	41.0	46.0	5	12	5	6.5	0
26 FT	16	17	13	10	6	8	6	7	61.3	40.0	40.0	6	15	46.0	51.0	6	15	33.0	34.0	6	6.5	6	7	56.6	145	157	6	6.5	41.0	46.0	5	12	5	6.5	0
28 FT	16	18	14	10	6	8	6	7.5	61.0	36.0	40.0	6	15	46.0	51.0	6	15	33.0	35.0	6	7	6	7	56.6	146	158	6	6.5	41.0	46.0	5	12	5	6	0
30 FT	17	19	14	10	6	7.5	6	7.5	59.6	37.0	41.0	6	14	45.0	50.0	6	14	32.0	34.0	6	7	6	7.5	54.8	147	159	6	6	41.0	46.0	5	12	5	6	0
32 FT	18	20	14	10	6	7	6	7	59.9	38.0	42.0	6	13	45.0	50.0	6	13	32.0	33.0	6	7	6	7.5	55.0	148	160	6	6	41.0	46.0	5	12	5	6	0
34 FT	18	20	14	10	6	6.5	6	6.5	59.8	38.0	42.0	6	13	45.0	50.0	6	13	32.0	34.0	6	6	6	7.5	54.9	148	160	6	6	41.0	46.0	5	12	5	6	0
36 FT	19	21	15	10	6	6.5	6	7	60.3	43.0	43.0	6	13	45.0	50.0	6	13	31.0	33.0	6	6.5	6	7.5	55.3	149	161	6	6	41.0	47.0	5	12	6	8	0
38 FT	20	22	15	10	6	6.5	6	6.5	60.6	44.0	44.0	6	12	45.0	50.0	6	12	31.0	32.0	6	6.5	6	7.5	55.5	150	162	6	6	41.0	47.0	5	12	6	8	0
40 FT	20	23	16	10	6	6.5	6	6.5	60.9	44.0	44.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6.5	6	7.5	55.9	151	163	6	6	41.0	47.0	5	12	6	8	0
42 FT	21	23	16	10	6	6.5	6	6.5	61.1	45.0	45.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6	6	7.5	55.8	151	163	7	7.5	44.0	50.0	5	12	6	8	0
44 FT	22	24	17	10	6	6	6	6.5	61.9	46.0	46.0	6	12	45.0	49.0	6	12	31.0	32.0	6	6	6	7	56.3	152	164	7	7.5	44.0	50.0	5	12	6	7.5	0
46 FT	22	25	17	10	6	6	6	6	61.9	46.0	46.0	6	12	45.0	48.0	6	12	31.0	32.0	6	6	6	7	56.5	153	165	7	8	44.0	50.0	5	12	6	7.5	0
48 FT	23	26	18	10	6	6	6	6.5	62.5	47.0	47.0	6	12	44.0	48.0	6	12	31.0	31.0	6	6	6	6.5	57.0	154	166	7	8	44.0	50.0	5	12	6	7	0
50 FT	23	26	18	10	7	8	6	6	62.5	47.0	47.0	6	12	44.0	48.0	6	12	31.0	31.0	6	6	6	6.5	56.9	154	166	7	7.5	44.0	50.0	5	12	6	7	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 9 FEET HE[GHT (HT): 11 THRU 12 FEET

DATE EFFECTIVE: DATE PREPARED:

THIS SHEET HAB BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

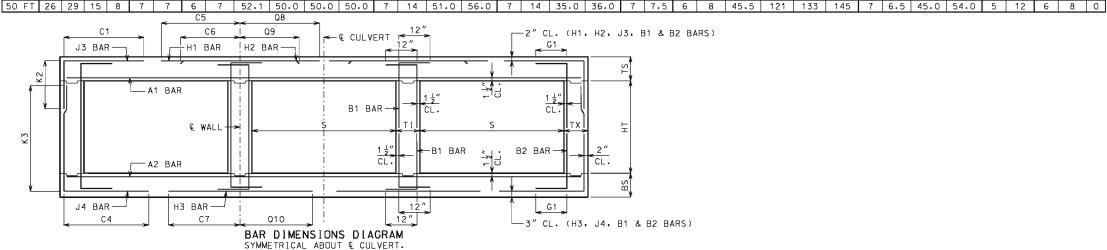
12/01/2011 9/29/2011

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SHEET NO. 13 OF 27

											SPAN	(S)	= 1	O FT			HEI	GHT (	HT) =	5 F	T OF	₹ 6	FT (	OR 7 I	FT										
		MEMBE									TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						WAL	L BAF	RS
DESIGN	Т	HICKN	ESS	A1	BARS			J.	BARS				H1	BARS			H2	BARS		A2 I	BARS			J4	BARS				НЗ	BARS		В1	BARS	B2	BARS
FILL	TS	BS 1	тх ті	SIZE	SPA.	SIZE	E SPA.	C1	HT=5'	K2  HT=6′	HT=7'	S I ZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=5'	K3 HT=6'	HT=7'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	13	9	8 8	5	6.5	4	7	51.9	29.0	29.0	29.0	5	16	98.5	74.5	5	16	29.0	27.0	4	6	4	6	47.4	65	77	89	5	6.5	45.0	47.0	5	12	5	12 12
2 FT	13	9	8 8	5	6.5	4	6.5	51.9	29.0	29.0	29.0	5	14	98.5	74.5	5	14	28.0	29.0	5	8.5	5	6.5	43.3	65	77	89	5	6	44.0	46.0	5	12	5	12 12
4 FT	9	9	8 8	5	7.5	6	7.5	48.4	25.0	29.0	29.0	5	13	59.0	76.0	5	13	30.0	30.0	5	7.5	5	6.5	39.0	65	77	89	6	6.5	46.0	49.0	5	10	5	12 12
6 FT	9	9	8 8	5	8	5	6	39.8	29.0	29.0	29.0	5	13	49.0	55.0	5	13	28.0	29.0	5	7.5	6	7	39.8	65	77	89	6	6	45.0	48.0	5	12	5	12 12
8 FT	10	10	8 8	5	8	5	7.5	36.8	26.0	26.0	30.0	5	13	45.0	50.0	5	13	28.0	28.0	5	7	5	6.5	34.8	66	78	90	6	6.5	44.0	48.0	5	12	5	12 0
10 FT	10	11	8 8	5	8	5	6.5	35.4	26.0	26.0	30.0	6	15	47.0	51.0	6	15	30.0	31.0	5	6.5	5	7.5	32.9	67	79	91	6	6.5	43.0	49.0	5	12	5	12 0
12 FT	11	12	8 8	5	7.5	5	7	33.6	27.0	27.0	31.0	6	16	45.0	50.0	6	16	30.0	31.0	5	6	5	8.5	31.6	68	80	92	6	6.5	42.0	49.0	5	12	5	12 0
14 FT	12	13	8 8	5	7	5	8	32.4	28.0	28.0	32.0	6	16	44.0	50.0	6	16	29.0	31.0	5	6	5	8.5	30.9	69	81	93	6	6.5	42.0	49.0	5	12	5	12 0
16 FT	13	14	8 8	5	6.5	5	8	31.3	29.0	29.0	33.0	6	16	44.0	50.0	6	16	29.0	31.0	6	8	5	8.5	30.3	70	82	94	6	7	42.0	49.0	5	12	5	12 0
18 FT	14	15	8 8	5	6	5	8.5	30.5	30.0	30.0	34.0	6	16	43.0	50.0	6	16	29.0	31.0	6	7.5	5	8.5	29.8	71	83	95	6	7	41.0	49.0	5	12	5	12 0
20 FT	15	16	8 8	6	8	5	8	34.9	31.0	31.0	35.0	6	16	48.0	56.0	6	16	35.0	37.0	6	7	5	8	29.4	72	84	96	6	7	41.0	49.0	5	12	5	12 0
22 FT	16	17	8 8	6	8	5	7	34.4	32.0	32.0	36.0	6	15	48.0	56.0	6	15	34.0	37.0	6	7	5	7	29.0	73	85	97	6	6.5	41.0	50.0	5	12	5	12 0
24 FT	17	18	8 8	6	7.5	5	6.5	34.0	37.0	37.0	37.0	6	14	48.0	56.0	6	14	34.0	36.0	6	6.5	5	6.5	28.9	74	86	98	6	6.5	41.0	50.0	5	12	5	11 0
26 FT	18	19	8 8	6	7	5	6.5	33.9	38.0	38.0	38.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6.5	28.8	75	87	99	6	6	41.0	50.0	5	12	5	10 0
28 FT	19	20	8 8	6	6.5	5	6	33.8	39.0	39.0	39.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6	28.8	76	88	100	6	6	41.0	50.0	5	12	5	9.5 0
30 FT	19	21	8 8	6	6	5	6	33.8	39.0	39.0	39.0	6	12	47.0	55.0	6	12	33.0	36.0	6	6	6	7.5	31.6	77	89	101	7	7.5	44.0	53.0	5	12	5	9.5 0
32 FT	20	22	8 8	6	6.5	6	7.5	37.8	44.0	44.0	44.0	6	12	47.0	55.0	6	12	33.0	35.0	6	6	6	7	31.8	78	90	102	7	7.5	44.0	53.0	5	12	5	9.5 0
34 FT	21	23	8 8	6	6	6	7	36.8	45.0	45.0	45.0	6	12	46.0	55.0	6	12	32.0	34.0	6	6	6	6.5	30.9	79	91	103	7	7.5	44.0	53.0	5	12	5	9.5 0
36 FT	22	23	8 8	6	6	6	6.5	36.8	46.0	46.0	46.0	7	15	51.0	60.0	7	15	36.0	38.0	6	6	6	6.5	31.0	79	91	103	7	7	44.0	53.0	5	12	5	9.5 0
38 FT	23	24	8 8	7	7.5	6	6	36.8	47.0	47.0	47.0	7	15	51.0	59.0	7	15	36.0	37.0	6	6	6	6	31.1	80	92	104	7	7	44.0	53.0	5	12	5	8.5 0
40 FT	23	25	8 8	7	7.5	6	6	36.9	47.0	47.0	47.0	7	15	51.0	59.0	7	15	36.0	38.0	6	6	6	6	31.1	81	93	105	7	7	44.0	53.0	5	12	5	8 0
42 FT	24	26	8 8	7	7.5	6	6	37.0	48.0	48.0	48.0	7	14	51.0	59.0	7	14	36.0	37.0	7	8	7	6.5	34.4	82	94	106	7	7	44.0	53.0	5	12	5	7.5 0
44 FT	25	26	9 8	7	7	6	6.5	37.8	49.0	49.0	49.0	7	14	51.0	59.0	7	14	36.0	37.0	7	7.5	6	6.5	32.0	82	94	106	7	7	44.0	53.0	5	12	5	8.5 0
46 FT	25	27	9 8	7	7	6	6.5	37.9	49.0	49.0	49.0	7	14	51.0	59.0	7	14	36.0	37.0	7	7.5	6	6.5	32.0	83	95	107	7	7	44.0	53.0	5	12	5	8 0
48 FT	26	28	9 8	7	7	6	6.5	38.0	50.0	50.0	50.0	7	14	51.0	58.0	7	14	35.0	37.0	7	7.5	6	6	32.3	84	96	108	7	7	44.0	53.0	5	12	5	7.5 0
50 FT	27	28	9 8	7	7	6	6	38.0	51.0	51.0	51.0	7	14	51.0	58.0	7	14	35.0	37.0	7	7	6	6	32.4	84	96	108	7	6.5	44.0	53.0	5	12	5	7 0

											SPAN	(5)	= 1	0 FT			HEI	GHT (	HT) =	- B	FT O	R 9	FT (	OR 10	FT										
		MEMBER									TOP SL	AB B	ARS											E	BOTTOM	SLAB E	BARS						₩AL	L BA	RS
DESIGN	T	H I CKNE:	SS	A1	BARS			J3	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS TX	ΤI	SIZE	SPA.	SIZE	SPA.	C1	HT=8'	K2 HT=9'	HT=10	, S I ZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	13	9 8	8	5	6.5	5	8.5	54.9	29.0			5	16	100.5	74.5	5	16	30.0	30.0	5	8.5	6	6.5	74.1	101	113	125	5	6	46.0	47.0	5	12	5	12 12
2 FT	13	9 8	8	5	6.5	5	8	54.9	29.0	33.0		5	14	100.5	74.5	5	14	28.0	28.0	5	7.5	6	6	65.8	101	113	125	6	7	47.0	50.0	5	12	5	11.5 12
4 FT	9	9 9	8	5	7	5	6	65.9	29.0	29.0	29.0	5	13	74.0	76.0	5	13	30.0	31.0	5	7.5	6	6.5	57.6	101	113	125	6	6.5	46.0	50.0	5	12	5	11.5 12
6 FT	9	9 9	8	5	8	5	6	51.8	29.0	29.0	29.0	5	13	51.0	57.0	5	13	29.0	29.0	5	7	6	6	52.9	101	113	125	6	6	45.0	48.0	5	12	5	11.5 12
8 FT	9	10 9	8	5	8	5	6	48.1	29.0	29.0	29.0	6	15	49.0	52.0	6	15	30.0	31.0	5	7	6	6.5	51.0	102	114	126	6	6	44.0	49.0	5	12	5	11 0
10 FT	10	11 9	8	5	8	5	6	46.5	30.0	30.0		5	12	44.0	48.0	5	12	27.0	28.0	5	6.5	6	6.5	49.5	103	115	127	6	6.5	43.0	49.0	5	12	5	10.5 0
12 FT	11	12 9	8	5	7.5	6	7	48.1	31.0	31.0	35.0	6	16	45.0	50.0	6	16	30.0	31.0	5	6	6	6.5	48.4	104	116	128	6	6.5	43.0	49.0	5	12	5	9.5 0
14 FT	12	13 9	8	5	7	6	7	47.0	32.0	32.0	36.0	6	16	45.0	50.0	6	16	29.0	31.0	5	6	6	7	47.4	105	117	129	6	6.5	42.0	49.0	5	12	5	8.5 0
16 FT	13	14 9	8	5	6.5	6	7	46.0	33.0	33.0	37.0	6	16	44.0	50.0	6	16	29.0	31.0	6	8	6	7	46.5	106	118	130	6	7	42.0	49.0	5	12	5	8.5 C
18 FT	14	15 9	8	5	6	6	7	45.3	34.0	34.0	38.0	6	16	43.0	49.0	6	16	29.0	31.0	6	7.5	6	7	45.9	107	119	131	6	7	42.0	49.0	5	12	5	8.5 C
20 FT	15	16 9	8	6	8	6	7	50.5	35.0	35.0	39.0	6	16	49.0	55.0	6	16	35.0	37.0	6	7	6	6.5	45.3	108	120	132	6	7	42.0	49.0	5	12	5	8.5 C
22 FT	15	17 11	8	6	7.5	5	6	47.1	35.0	35.0	35.0	6	15	48.0	55.0	6	15	35.0	37.0	6	7	5	7	42.1	109	121	133	6	6.5	42.0	50.0	5	12	5	8 C
24 FT	17	18 11	8	6	7.5	6	8.5	50.8	37.0	37.0	37.0	6	14	48.0	55.0	6	14	33.0	36.0	6	6.5	5	6.5	42.0	110	122	134	6	6.5	42.0	50.0	5	12	5	7.5 C
26 FT	18	19 11	8	6	7	6	8	50.4	38.0	38.0	38.0	6	13	47.0	55.0	6	13	33.0	35.0	6	6.5	5	6	41.8	111	123	135	6	6	42.0	50.0	5	12	5	7.5
28 FT	18	20 12	8	6	7	6	8	51.0	38.0	38.0	38.0	6	13	47.0	54.0	6	13	34.0	36.0	6	6.5	5	6.5	41.9	112	124	136	6	6	42.0	50.0	5	12	5	7.5
30 FT	19	21 12	8	6	6.5	6	7.5	50.9	39.0	39.0	39.0	6	13	47.0	54.0	6	13	33.0	35.0	6	6.5	5	6.5	41.9	113	125	137	7	7.5	45.0	53.0	5	12	5	7 C
32 FT	20	22 12	8	6	6.5	6	7	50.9	40.0	40.0	40.0	6	12	47.0	54.0	6	12	32.0	34.0	6	6	5	6.5	42.0	114	126	138	7	7.5	45.0	53.0	5	12	5	7 C
34 FT	21	23 12	8	6	6	6	7.5	49.6	41.0	41.0	41.0	6	12	46.0	53.0	6	12	31.0	33.0	6	6	5	6.5	40.8	115	127	139	7	7.5	45.0	53.0	5	12	5	7 C
36 FT	22	24 12	8	6	6	6	7	49.8	42.0	42.0	42.0	7	15	51.0	58.0	7	15	36.0	37.0	6	6	5	6.5	40.9	116	128	140	7	7.5	45.0	53.0	5	12	5	7 C
	_	24 13	8	6	6	6	7.5	50.4	42.0	42.0	42.0	7	15	51.0	58.0	7	15	36.0	38.0	6	6	5	6	41.1	116	128	140	7	7	45.0	53.0	5	12	5	6.5 0
	23	25 13	8	7	7.5	6	7.5	50.4	43.0	43.0	43.0	7	15	51.0	58.0	7	15	36.0	37.0	6	6	5	6	41.4	117	129	141	7	7	45.0	53.0	5	12	5	6.5 0
-		26 13	8	7	7.5	6	6.5	50.5	44.0		44.0	7	15	51.0	57.0	7	15	35.0	36.0	7	8	5	6	41.5	118	130	142	7	7	45.0	53.0	5	12	5	6.5 0
		27 14	8	7	7.5	6	7	51.3	44.0	44.0	44.0	7	14	51.0	57.0	7	14	36.0	37.0	7	8	5	6	41.9	119	131	143	7	7	45.0		5	12	5	6 0
-		27 14		7	7	6	7	51.3	45.0	45.0	45.0	7	14	51.0	57.0	7	14	35.0	36.0	7	7.5	5	6	42.0	119	131	143	7	6.5	45.0	53.0	5	12	5	6 0
		28 14		7	7	6	7	51.4	46.0			7	15	51.0	56.0	7	15	35.0	36.0	7	7.5	5	6	42.1	120	132	144	7	6.5	45.0		5	12	5	6 0
50 ET	26	20 16	1 0	1 7	7	6	7	50 4	1 EO O	1 50 0	1 50 0	1 7	1 4 4	51 0	1 56 0	7	1 1 1	1 3 E O	36 0	7	17 6	ا د	Ω	15 5	121	1 1 3 3 1	1 1 5	1 7 1		45.0	1640	I =	1 12 '	ا م ا	9 0



J IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS.

AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT DR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY• MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SPAN (S): 10 FEET HEIGHT (HT): 5 THRU 10 FEET

12/01/2011 DATE EFFECTIVE: DATE PREPARED:

9/29/2011

703.87

SHEET NO. 14 OF 27

																																		_	
											SPAN (	(S)	= 10	) FT		H	IE I G	HT (H	T) =	11	FT O	R 12	2 FT	OR 1	3 FT										
		MEME									TOP SL	AB B	ARS											E	BOTTOM	SLAB	BARS						₩AL	L BA	،RS
DESIGN FILL	T	HICK	NESS	A 1	BARS			J.	BARS				H.	BARS		<u> </u>	H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	В.	2 BARS
FILL	TS	BS	ТХ Т	SIZI	E SPA.	SIZE	SPA.	C1	HT=11'	K2 HT=12	'HT=13'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	K3 HT=12	HT=13	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	13	10	9 10	) 5	6.5	5	6.5	55.9	33.0	33.0	33.0	5	16	101.5	75.5	5	16	30.0	29.0	5	8.5	6	6	82.3	138	150	162	5	6.5	49.0	49.0	5	10	5	8.5 12
2 FT	13	10	10 10	) 5	6.5	5	6.5	56.5	33.0	33.0	33.0	5	14	101.5	75.5	5	14	29.0	29.0	5	8	6	6.5	83.0	138	150	162	5	6.5	47.0	48.0	5	12	5	8 12
4 FT	9	10	10 10	) 5	7	6	7	56.5	29.0	29.0	33.0	5	13	101.5	77.0	5	13	31.0	31.0	5	7	6	6	81.3	138	150	162	5	6	46.0	48.0	5	11	5	8 12
6 FT	9	11	10 10	) 5	8	6	7	75.6	29.0	29.0	33.0	5	13	54.0	53.0	5	13	29.0	29.0	5	7	6	6	77.8	139	151	163	5	6	44.0	47.0	5	12	5	8 12
8 FT	9	11	11 10	) 5	8	6	7	64.6	29.0	29.0	33.0	5	12	47.0	48.0	5	12	28.0	28.0	5	6.5	6	6.5	69.5	139	151	163	6	7	45.0	49.0	5	12	5	7.5 0
10 FT	10	11	11 10	) 5	8	5	6	61.1	30.0	30.0	30.0	5	12	46.0	47.0	5	12	28.0	28.0	5	6	6	6	65.8	139	151	163	6	6.5	45.0	48.0	5	12	5	7.5 0
12 FT	11	12	11 10	) 5	7.5	5	6	60.3	31.0	31.0	31.0	5	12	44.0	47.0	5	12	27.0	28.0	5	6	6	6	65.1	140	152	164	6	6.5	44.0	49.0	5	12	5	7.5 0
14 FT	12	13	11 10	) 5	7	6	7.5	62.6	32.0	32.0	36.0	5	12	43.0	46.0	5	12	27.0	28.0	5	6	6	6.5	64.4	141	153	165	6	6.5	44.0	49.0	5	12	5	7 0
16 FT	13	14	12 10	5	6.5	6	8	61.3	33.0	33.0	37.0	5	12	42.0	46.0	5	12	27.0	28.0	6	8	6	7	63.0	142	154	166	6	7	44.0	49.0	5	12	5	7 0
18 FT	13	15	12 10	5	6.5	6	7	59.3	33.0	37.0	37.0	6	15	45.0	48.0	6	15	30.0	31.0	6	7.5	6	6.5	62.8	143	155	167	6	7	44.0	49.0	5	12	5	7 0
20 FT	14	16	13 10	5	6	6	7.5	58.8	34.0	38.0	38.0	6	15	44.0	48.0	6	15	30.0	31.0	6	7	6	7	61.8	144	156	168	6	7	44.0	49.0	5	12	5	6.5 0
22 FT	15	17	13 10	) 6	8	6	6.5	64.6	35.0	39.0	39.0	6	15	50.0	54.0	6	15	36.0	37.0	6	7	6	6.5	61.4	145	157	169	6	6.5	44.0	50.0	5	12	5	6.5 0
24 FT	16	18	14 10	) 6	8	6	7	64.6	36.0	40.0	40.0	6	15	49.0	54.0	6	15	35.0	37.0	6	6.5	6	6.5	60.5	146	158	170	6	6.5	44.0	50.0	5	12	5	6 0
26 FT	17	19	14 10	_	7.5	6	6.5	64.5	37.0	41.0	41.0	6	14	49.0	54.0	6	14	35.0	37.0	6	6.5	6	6.5	60.4	147	159	171	6	6	44.0	50.0	5	12	5	6 0
28 FT	18	20	15 10	) 6	7	6	6.5	64.9	42.0	42.0	42.0	6	13	48.0	54.0	6	13	34.0	36.0	6	6.5	6	6.5	60.3	148	160	172	6	6	44.0	50.0	5	12	6	8 0
30 FT	19	21	15 10		6.5	6	6.5	65.1	43.0	43.0	43.0	6	13	48.0	54.0	6	13	33.0	35.0	6	6.5	6	6.5	60.4	149	161	173	7	7.5	47.0	53.0	5	12	6	8 0
32 FT	20	22	16 10		6.5	6	6.5	65.5	44.0	44.0	44.0	6	12	48.0	53.0	6	12	33.0	34.0	6	6	6	7	60.5	150	162	174	7	7.5	47.0	53.0	5	12	6	8 0
34 FT	20	23	16 10		6.5	6	6.5	63.5	44.0	44.0	44.0	6	12	47.0	53.0	6	12	33.0	35.0	6	6	6	7.5	58.9	151	163	175	7	7.5	46.0	53.0	5	12	6	8 0
36 FT		24	16 10		6	6	6	63.9	45.0	45.0	45.0	6	12	47.0	53.0	6	12	32.0	34.0	6	6	6	7	59.1	152	164	176	7	7.5	46.0	53.0	5	12	6	8 0
38 FT	22	24	17 10		6	6	6	64.4	46.0	46.0	46.0	7	15	52.0	58.0	7	15	37.0	38.0	6	6	6	7	59.0	152	164	176	7	7	46.0	53.0	5	12	6	7.5 0
40 FT	23	25	17 10		6	6	6	64.6	47.0	47.0	47.0	7	15	52.0	57.0	7	15	36.0	37.0	6	6	6	7	59.3	153	165	177	7	7	46.0	53.0	5	12	6	7.5 0
42 FT	23	26	18 10		7.5	6	6	65.0	47.0	47.0	47.0	7	15	52.0	57.0	7	15	37.0	38.0	7	8	6	6.5	59.6	154	166	178	7	7	46.0	54.0	5	12	6	7 0
44 FT	24	27	19 10	_	7.5	6	6	65.8	44.0	48.0	48.0	7	15	52.0	57.0	7	15	36.0	37.0	7	8	6	6.5	60.0	155	167	179	7	7	46.0	54.0	5	12	6	7 0
46 FT	24	27	19 10		7	6	6	65.6	48.0	48.0	48.0	7	14	52.0	57.0	7	14	36.0	38.0	7	7.5	6	6.5	59.9	155	167	179	7	6.5	46.0	54.0	5	12	6	6.5 0
48 FT	25	28	20 10	7	7	6	6	66.4	45.0	49.0	49.0	7	14	52.0	56.0	7	14	36.0	37.0	7	7.5	6	6	60.4	156	168	180	7	6.5	46.0	54.0	5	12	6	6.5 0
50 FT	26	29	20 10	7	7	7	7.5	71.6	50.0	50.0	50.0	7	15	51.0	55.0	7	15	36.0	37.0	7	7.5	6	6	60.6	157	169	181	7	6.5	47.0	54.0	5	12	6	6.5 0

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 10 FEET HEIGHT (HT): 11 THRU 13 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

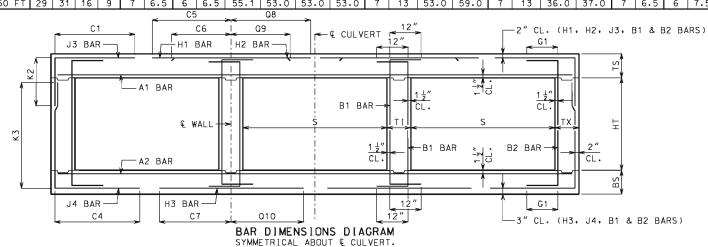
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SHEET NO. 15 OF 27

		C5	Q8	•		
	J3 BAR	C6 H1 BAR H	09 12 BAR —	© CULVERT 12"	2" CL. (H1, H2	, J3, B1 & B2 BARS)
K2 K2	A1	BAR BAR	-	B1 BAR $\rightarrow$ $\frac{1\frac{1}{2}''}{CL}$ .  S $\frac{1\frac{1}{2}''}{CL}$ $\leftarrow$ B1 BAR	\$ 1½ CL.  S TX	_
	J4 BAR————————————————————————————————————			IONS DIAGRAM BOUT & CUI VERT.	3" CL. (H3, J4	<del>y</del>

											SPAN	(S)	= 1	1 FT			HE I	GHT (	HT) =	· 6 I	FT OF	₹ 7	FT (	DR 8	FT										
		MEMBI	ER								TOP SL	AB B	ARS											Е	BOTTOM:	SLAB I	BARS						₩AL	L BAI	RS
DESIGN	T	HICKN	IESS	A1	BARS			J:	3 BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				H3	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS	тх Т	I SIZ	E SPA.	SIZI	E SPA.	C1	HT=6'	K2 HT=7'	HT=8'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	K3 HT=7'	HT=8'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	13	9	8 8	5	6.5	5	9	58.5	29.0	29.0	33.0	5	13	108.5	80.5	5	13	30.0	33.0	5	8.5	5	6	52.6	77	89	101	6	7	50.0	53.0	5	12	5	12 12
2 FT	14	9	8 8	5	6	4	6	55.5	30.0	30.0	30.0	5	14	106.5	80.5	5	14	29.0	28.0	5	7.5	6	6.5	50.8	77	89	101	6	6.5	49.0	52.0	5	12	5	12 12
4 FT	10	9	8 8	5	6.5	5	6	49.1	30.0	30.0	30.0	5	12	66.0	82.0	5	12	32.0	33.0	5	7.5	6	6.5	45.9	77	89	101	6	6	49.0	52.0	5	11.5	5	12 12
6 FT	10	10	8 8	5	7	5	6	42.8	30.0	30.0	30.0	5	12	53.0	63.0	5	12	30.0	31.0	5	7	5	6	39.8	78	90	102	6	6	47.0	52.0	5	12	5	12 12
8 FT	10	11	8 8	5	7	6	7	43.0	26.0	30.0	30.0	6	15	52.0	56.0	6	15	32.0	32.0	5	6.5	5	6.5	37.4	79	91	103	6	6.5	46.0	52.0	5	12	5	12 0
10 FT	11	12	8 8	5	7	5	6	37.6	27.0	31.0	31.0	6	15	50.0	55.0	6	15	31.0	32.0	5	6	5	7	35.6	80	92	104	6	6.5	45.0	52.0	5	12	5	12 0
12 FT	12	13	8 8	5	7	5	6.5	36.0	28.0	32.0	32.0	6	15	48.0	54.0	6	15	31.0	32.0	5	6	5	7.5	34.6	81	93	105	6	6.5	45.0	52.0	5	12	5	12 0
14 FT	13	14	8 8	5	6.5	5	7	34.6	33.0	33.0	33.0	6	15	47.0	54.0	6	15	31.0	32.0	6	8	5	7.5	33.8	82	94	106	6	6.5	44.0	53.0	5	12	5	12 0
16 FT	14	15	8 8	5	6	5	7	33.6	34.0	34.0	34.0	6	14	46.0	53.0	6	14	30.0	32.0	6	7.5	5	7.5	33.1	83	95	107	6	6.5	44.0	53.0	5	12	5	12 0
18 FT	15	16	8 8	6	8	5	6.5	37.9	35.0	35.0	35.0	6	14	51.0	59.0	6	14	36.0	38.0	6	7	5	7.5	32.6	84	96	108	6	6.5	44.0	53.0	5	12	5	11 0
20 FT	16	17	8 8	6	8	5	6.5	37.3	36.0	36.0	36.0	6	14	51.0	59.0	6	14	36.0	38.0	6	7	5	7	32.1	85	97	109	6	6.5	44.0	53.0	5	12	5	10 0
22 FT	17	18	8 8	6	7.5	5	6	36.9	37.0	37.0	37.0	6	14	50.0	59.0	6	14	36.0	38.0	6	6.5	5	6.5	31.9	86	98	110	6	6.5	44.0	53.0	5	12	5	9.5 0
24 FT	18	19	8 8	6	7	5	6	36.5	38.0	38.0	38.0	6	13	50.0	59.0	6	13	36.0	38.0	6	6	5	6.5	31.6	87	99	111	6	6	44.0	53.0	5	12	5	9.5 0
26 FT	19	21	8 8	6	6.5	6	7.5	40.4	39.0	39.0	43.0	6	13	50.0	59.0	6	13	35.0	38.0	6	6	6	7.5	34.4	89	101	113	7	7.5	47.0	56.0	5	12	5	9.5 0
28 FT	20	22	9 8	6	6.5	5	6	37.1	40.0	40.0	40.0	6	12	49.0	58.0	6	12	35.0	37.0	6	6	5	6	31.9	90	102	114	7	7.5	47.0	56.0	5	12	5	8.5 0
30 FT	21	23	10 8	6	6	5	6.5	37.9	41.0	41.0	41.0	6	12	49.0	58.0	6	12	34.0	37.0	7	8	5	6.5	32.4	91	103	115	7	7	47.0	56.0	5	12	5	8.5 0
32 FT	22	24	10 8	6	6	5	6.5	37.8	42.0	42.0	42.0	7	15	54.0	63.0	7	15	39.0	41.0	7	7.5	5	6.5	32.5	92	104	116	7	7	47.0	57.0	5	12	5	8 0
34 FT	23	25	10 8	7	7.5	5	6.5	37.8	43.0	43.0	43.0	7	15	54.0	63.0	7	15	38.0	40.0	7	7.5	5	6	32.5	93	105	117	7	6.5	47.0	57.0	5	12	5	8 0
36 FT	24	25	10 8	7	7.5	5	6	36.5	44.0	44.0	44.0	7	14	54.0	62.0	7	14	37.0	39.0	7	7	5	6	31.6	93	105	117	7	6.5	47.0	56.0	5	12	5	8 0
38 FT			10 8	7	7	5	6	36.6	45.0	45.0		7	14	53.0	62.0	7	14	37.0	38.0	7	7	5	6	31.8	94	106	118	7	6.5	47.0	56.0	5	12	5	8 0
40 FT	25	27	10 8	7	6.5	5	6	36.8	45.0	45.0	45.0	7	13	53.0	62.0	7	13	37.0	39.0	7	7	6	7	34.6	95	107	119	7	6.5	46.0	56.0	5	12	5	8 0
42 FT	26	28	10 8	7	7	6	7	40.8	50.0	50.0	50.0	7	13	53.0	62.0	7	13	37.0	38.0	7	7	6	7	34.9	96	108	120	7	6.5	46.0	56.0	5	12	5	8 0
44 FT	27	29	10 8	7	6.5	6	7	40.9	51.0	51.0	51.0	7	13	53.0	61.0	7	13	36.0	37.0	7	7	6	6.5	35.0	97	109	121	7	6.5	46.0	56.0	5	12	5	7.5 0
46 FT	28	29	11 8	7	6.5	6	7.5	41.6	52.0	52.0	52.0	7	13	53.0	61.0	7	13	36.0	37.0	7	6	6	7.5	35.6	97	109	121	7	6	47.0	57.0	5	12	5	7.5 0
		30	11 8	7	6	6	7.5	41.8	52.0	52.0	52.0	7	12	53.0	61.0	7	12	36.0	37.0	7	6.5	6	7	35.6	98	110	122	7	6	47.0	57.0	5	12	5	7.5 0
50 FT	29	31	11 8	7	6	6	7	41.9	53.0	53.0	53.0	7	12	53.0	60.0	7	12	36.0	37.0	7	6.5	6	7	35.9	99	111	123	7	6	47.0	57.0	5	12	5	7.5 0

						SPAN	(S)	= 11	FT	HE	IGHT (I	HT) =	9 FT OR	10 FT	OR 11	FT									
	MEMBER					TOP	SLAB I	BARS							В	OTTOM S	SLAB B	ARS				₩AI	L BARS		
DESIG	THICKNESS	A1 BARS		J3 I	BARS			H1	BARS		H2 BARS		A2 BARS		J4	BARS			Н	3 BARS		B1 BARS	B2 BAR	≀S	
FILL	TS BS TX	TI SIZE SPA.	SIZE SPA.	C1 H	HT=9′ H	K2 T=10'HT=1	11′SIZ	ZE SPA.	C5 08	SIZE SP	A. C6	09	SIZE SPA.	SIZE SPA		HT=9'H		IT=11 SIZ	E SPA	. C7 C	110 S	IZE SPA.	SIZE SPA.	G1	
1 FT	13 9 9	9 5 6.5	5 8	59.3	33.0	33.0 33.	0 5	13	109.5 81.5	5 1	3 31.0	33.0	5 7.5	6 6	74.5	113	125	137 6	7	51.0 5	3.0	5 11.5	5 10.5	12	
2 FT	14 10 9	9 5 6	5 8	59.3	34.0	34.0 34.	0 5	14	109.5 81.5	5 1	4 29.0	28.0	5 7.5	6 7	70.6	114	126	138 5	6	47.0 5	0.0	5 12	5 10.5	12	
4 FT	10 10 9	9 5 6.5	5 6	59.3	30.0	30.0 30.	0 5	13	109.5 83.0	5 1	3 32.0	33.0	5 7	6 6.5	64.1	114	126	138 6	6.5	50.0 5	3.0	5 11.5	5 9.5	12	
6 FT	10 10 9	9 5 7	5 6	56.6	30.0	30.0 30.	0 5	12	55.0 61.0	5 1:	2 30.0	31.0	5 7	6 6	57.8	114	126	138 6	6	48.0 5	2.0	5 12	5 9.5	12	
8 FT	10 11 9	9 5 7	6 7.5	55.5	30.0	30.0 34.	0 6	15	53.0 56.0	6 1	5 32.0	33.0	5 6.5	6 6	55.6	115	127	139 6	6	47.0 5	2.0	5 12	5 9	0	
10 F1	11 12 9	9 5 7	6 7	53.5	31.0	35.0 35.	0 6	15	51.0 55.0	6 1	5 32.0	33.0	5 6	6 6	53.8	116	128	140 6	6.5	46.0 5	2.0	5 12	5 8.5	0	
12 F1	12 13 9	9 5 7	6 6.5	51.9	32.0	36.0 36.	0 6	15	49.0 54.0	6 1	5 31.0	33.0	5 6	6 6	52.4	117	129	141 6	6.5	46.0 5	2.0	5 12	5 8.5	0	
14 F1	13 14 9	9 5 6.5	6 6	50.5	33.0	37.0 37.	0 6	15	48.0 53.0	6 1	5 31.0	33.0	6 8	6 6	51.3	118	130	142 6	6.5	45.0 5	2.0	5 12	5 8.5	0	
16 FT	14 15 10	9 5 6	6 7	49.9	34,0	34.0 38.	0 6	15	47.0 53.0	6 1	5 31.0	33.0	6 7.5	6 7	50.4	119	131	143 6	6.5	45.0 5	2.0	5 12	5 8	0	
18 FT	15 16 10	9 6 8	6 7	54.9	35.0	35.0 39.	0 6	15	52.0 59.0	6 1	5 37.0	39.0	6 7	6 7	49.6	120	132	144 6	6.5	45.0 5	3.0	5 12	5 8	0	
20 FT	16 17 11	9 6 8	6 7.5	54.8	36.0	36.0 40.	0 6	14	52.0 58.0	6 1	4 36.0	39.0	6 7	6 8	49.3	121	133	145 6	6.5	45.0 5	3.0	5 12	5 7.5	0	
22 F1	17 18 12	9 6 7.5	6 8	54.8	37.0	37.0 37.	0 6	14	51.0 58.0	6 1	4 36.0	39.0	6 6.5	5 6	45.9	122	134	146 6	6.5	45.0 5	3.0	5 12	5 7.5	0	
24 F1	18 20 12	9 6 7	6 7.5	54.4	38.0	38.0 38.	0 6	13	51.0 58.0	6 1	3 36.0	38.0	6 6	5 6	45.8	124	136	148 6	6	45.0 5	3.0	5 12	5 7	0	
26 FT	19 21 12	9 6 6.5	6 7	53.9	39.0	39.0 43.	0 6	13	50.0 58.0	6 1	35.0	38.0	6 6	6 8.5	48.4	125	137	149 7	7.5	48.0 5	6.0	5 12	5 7	0	GENERAL NOTES:
28 F1	20 22 13	9 6 6.5	6 7.5	54.3	40.0	40.0 40.	0 6	12	50.0 58.0	6 1:	2 35.0	37.0	6 6	5 6	45.4	126	138	150 7	7.5	48.0 5	7.0	5 12	5 6.5	0	IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT
30 F1	21 23 13	9 6 6	6 7	54.1	41.0	41.0 41.	0 6	12	50.0 57.0	6 1;	2 34.0	36.0	7 8	5 6	45.4	127	139	151 7	7	48.0 5	7.0	5 12	5 6.5	0	GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2
32 F1	22 24 13	9 6 6	6 6.5	54.1	42.0	42.0 46.	0 7	15	54.0 62.0	7 1	5 39.0	41.0	7 7.5	6 8	48.4	128	140	152 7	7	48.0 5	7.0	5 12	5 6.5	0	FEET AND 4 FEET, FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR
34 F1	23 25 14	9 7 7.5	6 7	54.8	43.0	43.0 43.	0 7	15	54.0 62.0	7 1	5 38.0	40.0	7 7.5	5 6	45.8	129	141	153 7	6.5	48.0 5	7.0	5 12	5 6	0	DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS.
36 F1	23 25 14	9 7 7	6 7	53.3	43.0	43.0 43.	0 7	14	54.0 62.0	7 1	4 38.0	40.0	7 7	5 6	44.1	129	141	153 7	6.5	48.0 5	7.0	5 12	5 6	0	AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.
38 FT	24 26 14	9 7 7.5	6 7	53.4	44.0	44.0 44.	0 7	14	54.0 61.0	7 1	4 38.0	40.0	7 7	5 6	44.3	130	142	154 7	6.5	48.0 5	7.0	5 12	5 6	0	SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1
40 F1	25 27 14	9 7 7	6 6.5	53.4	45.0	45.0 45.	0 7	14	54.0 61.0	7 1	4 37.0	39.0	7 7	5 6	44.5	131	143	155 7	6.5	48.0 5	7.0	5 12	5 6	0	FOOT OR GREATER THAN 50 FEET.
42 F1	26 28 15	9 7 7	6 7	54.3	46.0	50.0 50.	0 7	13	54.0 60.0	7 1:	3 37.0	38.0	7 7	6 8	48.0	132	144	156 7	6	48.0 5	7.0	5 12	6 8	0	
44 F1	27 29 15	9 7 6.5	6 6.5	54.3	51.0	51.0 51.	0 7	13	53.0 60.0	7 1:	3 36.0	38.0	7 7	6 8	48.1	133	145	157 7	6	48.0 5	7.0	5 12	6 8	0	DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
46 F1	27 30 15	9 7 6.5	6 6	54.4	51.0	51.0 51.	0 7	13	53.0 60.0	7 1:	3 37.0	38.0	7 7	6 8	48.1	134	146	158 7	6	48.0 5	7.0	5 12	6 8	0	DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF
48 F1	28 30 16	9 7 6.5	6 6.5	55.0	52.0	52.0 52.	0 7	13	53.0 59.0	7 1:	3 36.0	37.0	7 6	6 7.5	48.5	134	146	158 7	6	48.0 5	7.0	5 12	6 8	0	EARTH FILL OR ROADWAY.
50 F1	29 31 16	9 7 6.5	6 6.5	55.1	53.0	53.0 53.	0 7	13	53.0 59.0	7 1:	3 36.0	37.0	7 6.5	6 7.5	48.8		147	159 7	6	48.0 5	7.0	5 12	6 8	0	CHI VEDIC MEET CIDENCILI AND CEDVICEARILITY DECLIDENTS FOR THE
			Ç5		Q8	_	•		1	•			•					· · ·							CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.
	C1	_	C6	Q9	)	1		_ 12″_		—2"	CL. (H1	. H2.	J3. B1 & F	12 BARS)											HIGGS IN THE ENGLISH ENGLISHED TO A NO THE ENGLISHED TO A NOTICE T





#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY• MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 11 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 6 THRU 11 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 16 OF 27

										•	SPAN (	S)	= 11	FT		ŀ	IE I G	HT (H	T) =	12	FT OI	R 13	3 FT	OR 1	4 FT										$\overline{}$
		MEMBE	:R								TOP SL	AB B	ARS											E	BOTTOM	SLAB	BARS						WAL	L BAI	สร
DESIGN	Т	HICKN	ESS	A1	BARS			J.	3 BARS				H′	I BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	B2	BARS
FILL	TS	BS T	Υ	SIZE	SPA.	SIZE	SPA.	C1	HT=12	K2 'HT=13	'HT=14'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=12'	K3 HT=13	HT=14	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	13	10 1	0 11	5	6.5	5	6	60.3	33.0	33.0	33.0	5	13	110.5	82.5	5	13	31.0	33.0	5	7.5	6	6	89.3	150	162	174	5	6	51.0	51.0	5	10	5	8 12
2 FT	14	11 1	0 11	5	6	5	6	60.3	34.0	34.0	34.0	5	14	110.5	82.5	5	14	30.0	32.0	5	7.5	6	6	89.3	151	163	175	5	6	50.0	51.0	5	12	5	8 12
4 FT	10	11 1	1 11	5	7	5	6	60.9	30.0	30.0	30.0	5	13	110.5	80.0	5	13	33.0	33.0	5	7	6	6.5	85.9	151	163	175	5	6	49.0	51.0	5	12	5	7.5 12
6 FT	10	11 1	1 11	5	7.5	5	6	79.0	30.0	30.0	30.0	5	12	58.0	57.0	5	12	31.0	31.0	5	6.5	6	6	77.5	151	163	175	6	6.5	50.0	53.0	5	12	5	7.5 12
8 FT	10	11 1	2 11	5	7.5	6	7.5	70.1	30.0	30.0	34.0	6	15	54.0	55.0	6	15	33.0	33.0	5	6.5	6	6	70.9	151	163	175	6	6	48.0	52.0	5	12	5	7 0
10 FT	11	12 1	2 11	5	7.5	6	8	68.5	31.0	31.0	35.0	6	16	52.0	54.0	6	16	32.0	33.0	5	6	6	6	69.9	152	164	176	6	6	47.0	52.0	5	12	5	7 0
12 FT	12	13 1	2 11	5	7	6	8	67.4	32.0	32.0	36.0	6	16	50.0	53.0	6	16	32.0	33.0	5	6	6	6.5	69.0	153	165	177	6	6	47.0	52.0	5	12	5	7 0
14 FT	13	14 1	2 11	5	6.5	6	7	66.4	33.0	37.0	37.0	6	16	49.0	53.0	6	16	32.0	33.0	6	8	6	6.5	68.3	154	166	178	6	6.5	47.0	52.0	5	12	5	6.5 0
16 FT	14	15 1	3 11	5	6	6	7	64.9	34.0	38.0	38.0	6	15	48.0	52.0	6	15	32.0	33.0	6	7.5	6	7	66.6	155	167	179	6	6.5	47.0	52.0	5	12	5	6.5 0
18 FT	15	16 1	3 11	6	8	6	6.5	70.3	39.0	39.0	39.0	6	15	54.0	58.0	6	15	37.0	39.0	6	7	9	6	66.0	156	168	180	6	6.5	47.0	52.0	5	12	5	6.5 0
20 FT	15	17   1	4 11	6	8	6	6.5	68.4	39.0	39.0	39.0	6	14	53.0	58.0	6	14	37.0	39.0	6	7	9	6.5	65.1	157	169	181	6	6.5	46.0	53.0	5	12	5	6 0
22 FT	17	18 1	4 11	6	7.5	6	6.5	69.0	41.0	41.0	41.0	6	14	53.0	58.0	6	14	37.0	39.0	6	6	9	6	64.5	158	170	182	6	6	46.0	53.0	5	12	5	6 0
24 FT	18	20 1	5 11	6	7	6	6.5	68.9	42.0	42.0	42.0	6	13	52.0	58.0	6	13	36.0	38.0	6	6	9	6	64.6	160	172	184	6	6	46.0	53.0	5	12	6	8 0
26 FT	19	21 1	5 11	6	6.5	6	6	68.6	43.0	43.0	43.0	6	13	52.0	57.0	6	13	36.0	38.0	6	6	9	6	64.3	161	173	185	7	7.5	49.0	56.0	5	12	6	8 0
28 FT	20	22 1	6 11	6	6.5	6	6	68.6	44.0	44.0	44.0	6	12	51.0	57.0	6	12	35.0	37.0	6	6	9	6	63.9	162	174	186	7	7.5	49.0	56.0	5	12	6	8 0
30 FT	21	23 1	7 11	6	6	6	6	69.0	45.0	45.0	45.0	6	12	51.0	57.0	6	12	34.0	36.0	7	8	9	6.5	64.0	163	175	187	7	7	49.0	57.0	5	12	6	7.5 0
32 FT	21	24 1	7 11	6	6	6	6	68.6	45.0	45.0	45.0	6	12	51.0	57.0	6	12	35.0	37.0	7	7.5	6	6.5	64.1	164	176	188	7	7	49.0	57.0	5	12	6	7.5 0
34 FT	22	25 1	8 11	6	6	6	6	69.1	46.0	46.0	46.0	7	15	55.0	62.0	7	15	40.0	41.0	7	7.5	6	6.5	64.4	165	177	189	7	6.5	49.0	57.0	5	12	6	7 0
36 FT	23	26 1	8 11	7	7.5	7	7.5	74.3	47.0	47.0	47.0	7	15	55.0	61.0	7	15	39.0	41.0	7	7.5	6	6	64.5	166	178	190	7	6.5	49.0	57.0	5	12	6	7 0
38 FT	24	26 1	8 11	7	7.5	7	8	72.6	48.0	48.0	48.0	7	14	55.0	61.0	7	14	38.0	40.0	7	7	6	6.5	62.4	166	178	190	7	6.5	49.0	57.0	5	12	6	7 0
40 FT	25	27 1	8 11	7	7	7	7	72.9	49.0	49.0	49.0	7	14	55.0	61.0	7	14	38.0	39.0	7	7	6	6	62.6	167	179	191	7	6.5	49.0	57.0	5	12	6	7 0
42 FT	25	28 1	9 11	7	7	7	7	73.3	49.0	49.0	49.0	7	14	55.0	60.0	7	14	38.0	40.0	7	7	6	6	62.9	168	180	192	7	6.5	49.0	57.0	5	12	6	6.5 0
44 FT	26	29 2	0 11	7	7	7	7.5	74.0	50.0	50.0	50.0	7	13	54.0	60.0	7	13	38.0	39.0	7	7	6	6	63.3	169	181	193	7	6	49.0	57.0	5	12	6	6.5 0
46 FT	27	30 2	1 11	7	6.5	7	7.5	74.6	51.0	51.0	51.0	7	13	54.0	59.0	7	13	37.0	38.0	7	7	6	6	63.6	170	182	194	7	6	49.0	57.0	5	12	6	6 0
48 FT	27	30 2	1 11	7	6	7	7	74.5	51.0	51.0	51.0	7	12	54.0	59.0	7	12	37.0	39.0	7	6	6	6	63.5	170	182	194	7	6	49.0	57.0	5	12	6	6 0
50 FT	28	31 2	2 11	7	6.5	7	7	75.3	52.0	52.0	58.0	7	13	54.0	59.0	7	13	37.0	38.0	7	6.5	7	7.5	67.0	171	183	195	7	6	49.0	58.0	5	12	6	6 0

#### Ç5 € CULVERT 12" C6 **Q9** -2" CL. (H1, H2, J3, B1 & B2 BARS) G1 J3 BAR — ⊢¦H1 BAR H2 BAR B1 BAR € WALL-1 ½" CL • -B1 BAR B2 BAR-CL. A2 BAR J4 BAR H3 BAR-G1 \_ —3" CL. (H3, J4, B1 & B2 BARS) BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT & CULVERT.

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 11 FEET HE[GHT (HT): 12 THRU 14 FEET

DATE EFFECTIVE: DATE PREPARED:

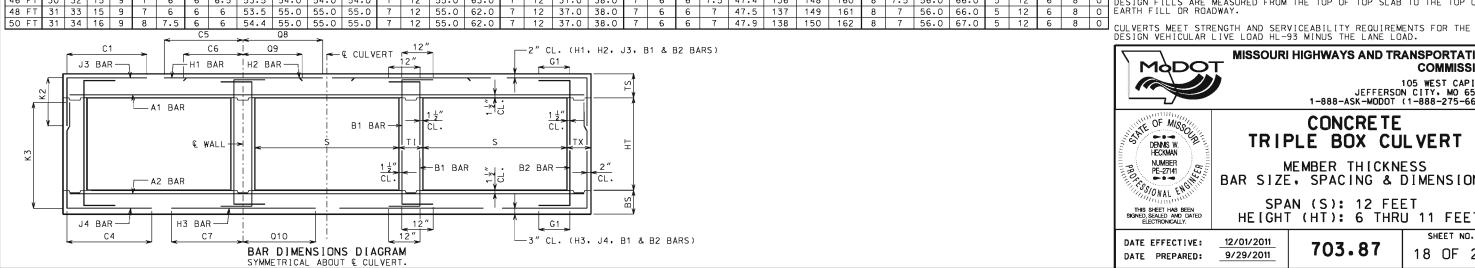
: 12/01/2011 : 9/29/2011

703.87

SHEET NO. 17 OF 27

											SPAN	(S)	= 1	2 FT			HEI	GHT (	HT) =	· 6 F	FT OF	₹ 7	FT (	DR 8 I	FT										
		MEMB									TOP SL	AB B	ARS											В	BOTTOM	SLAB	BARS						₩AL	L BAI	₹S
DESIGN	Т	HICKN	ESS	A1	BARS			J.	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		В1	BARS	B2	BARS
FILL	TS	BS	тх   т і	SIZE	SPA.	SIZE	SPA.	C1	HT=6'	K2   HT=7'	HT=8'	S I ZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=6'	K3 HT=7'	HT=8'	SIZE	SPA.	C7	Q10	SIZE	SPA.	S I ZE	SPA. G1
1 FT	14	9	8 8	5	6	4	6	59.1	30.0	30.0	30.0	5	12	114.5	86.5	5	12	31.0	34.0	5	7.5	6	7	54.6	77	89	101	6	6.5	53.0	56.0	5	12	5	12 12
2 FT	14	9	8 8	5	6	5	8.5	62.1	30.0	30.0	34.0	5	12	116.5	86.5	5	12	30.0	33.0	5	7.5	6	6.5	50.3	77	89	101	6	6	52.0	55.0	5	12	5	12 12
4 FT	11	10	8 8	5	6	5	6.5	48.9	31.0	31.0	31.0	5	12	69.0	88.0	5	12	33.0	35.0	5	7	5	6	42.6	78	90	102	6	6	51.0	56.0	5	12	5	12 12
6 FT	11	11	8 8	5	6.5	5	6.5	42.8	31.0	31.0	31.0	6	16	59.0	71.0	6	16	34.0	36.0	5	6.5	5	6.5	39.3	79	91	103	6	6.5	49.0	56.0	5	12	5	12 12
8 FT	11	12	8 8	5	6.5	5	6	39.9	31.0	31.0	31.0	6	14	55.0	61.0	6	14	33.0	34.0	5	6	5	7.5	36.6	80	92	104	6	6.5	48.0	56.0	5	12	5	12 0
10 FT	12	13	8 8	5	6.5	5	6.5	37.3	32.0	32.0	32.0	6	14	52.0	59.0	6	14	32.0	34.0	5	6	5	7.5	34.9	81	93	105	6	6	47.0	56.0	5	12	5	12 0
12 FT	13	14	8 8	5	6	5	7	35.4	33.0	33.0	33.0	6	14	51.0	58.0	6	14	32.0	34.0	6	8	5	8	33.8	82	94	106	6	6	47.0	56.0	5	12	5	12 0
14 FT	14	15	8 8	5	6	5	7	33.9	34.0	34.0	34.0	6	13	49.0	57.0	6	13	32.0	34.0	6	7.5	5	8	32.8	83	95	107	6	6	47.0	56.0	5	12	5	12 0
16 FT	15	16	8 8	6	8	5	6.5	37.9	35.0	35.0	35.0	6	13	55.0	63.0	6	13	37.0	40.0	6	7	5	8	32.1	84	96	108	6	6	46.0	56.0	5	12	5	12 0
18 FT	16	17	8 8	6	8	5	6.5	37.0	36.0	36.0	36.0	6	13	54.0	63.0	6	13	37.0	40.0	6	7	5	7	31.6	85	97	109	6	6	46.0	56.0	5	12	5	11.5 0
20 FT	17	18	8 8	6	7.5	5	6.5	36.4	37.0	37.0	37.0	6	12	53.0	63.0	6	12	37.0	40.0	6	6.5	5	6.5	31.1	86	98	110	6	6	46.0	56.0	5	12	5	10 0
22 FT	18	20	8 8	6	6.5	5	6	36.1	38.0	38.0	38.0	6	12	53.0	62.0	6	12	37.0	40.0	6	6	5	6	30.8	88	100	112	6	6	46.0	57.0	5	12	5	9.5 0
24 FT	20	21	8 8	6	6.5	6	7.5	39.5	44.0	44.0	44.0	6	12	52.0	62.0	6	12	36.0	39.0	7	8	6	7.5	33.8	89	101	113	7	7.5	49.0	59.0	5	12	5	9.5 0
26 FT	21	22	8 8	6	6	6	7	39.3	45.0	45.0	45.0	6	12	52.0	62.0	6	12	36.0	39.0	7	7.5	6	7	33.6	90	102	114	7	7.5	49.0	60.0	5	12	5	9.5 0
28 FT	22	23	8 8	6	6	6	6.5	39.0	46.0	46.0	46.0	7	15	57.0	67.0	7	15	41.0	44.0	7	7	6	6.5	33.4	91	103	115	7	7	49.0	60.0	5	12	5	8.5 0
30 FT	23	24	8 8	7	7.5	6	6	38.9	47.0	47.0	47.0	7	15	56.0	67.0	7	15	40.0	43.0	7	6.5	6	6	33.4	92	104	116	7	6.5	49.0	60.0	5	12	5	8 0
32 FT	24	25	9 8	7	7.5	6	7	39.8	48.0	48.0	48.0	7	14	56.0	66.0	7	14	40.0	42.0	7	6.5	6	7	34.0	93	105	117	7	6.5	49.0	60.0	5	12	5	8.5 0
34 FT	25	26	9 8	7	7	6	6.5	39.8	49.0	49.0	49.0	7	14	56.0	66.0	7	14	39.0	42.0	7	6	6	6.5	34.0	94	106	118	7	6	49.0	60.0	5	12	5	8 0
36 FT	26	27	9 8	7	7	6	6.5	39.8	50.0	50.0	50.0	7	13	56.0	66.0	7	13	39.0	41.0	7	6	6	6.5	34.1	95	107	119	7	6	49.0	60.0	5	12	5	7.5 0
38 FT	27	28	9 8	7	6.5	6	6	39.8	51.0	51.0	51.0	7	13	56.0	66.0	7	13	38.0	40.0	7	6	6	6	34.3	96	108	120	7	6	49.0	60.0	5	12	5	7 0
40 FT	28	29	9 8	7	6.5	6	6	38.9	52.0	52.0	52.0	7	12	56.0	65.0	7	12	37.0	39.0	7	6.5	6	6	33.4	97	109	121	8	7.5	55.0	66.0	5	12	5	7 0
42 FT	28	30	10 8	7	6	6	6.5	39.8	52.0	52.0	52.0	7	12	56.0	65.0	7	12	38.0	40.0	7	6.5	6	6.5	33.9	98	110	122	8	7.5	55.0	66.0	5	12	5	8 0
44 FT	29	31	10 8	7	6	6	6.5	39.9	53.0	53.0	53.0	7	12	55.0	64.0	7	12	38.0	39.0	7	6.5	6	6	34.0	99	111	123	8	7.5	55.0	66.0	5	12	5	7 0
46 FT	30	32	10 8	7	6	6	6	40.0	54.0	54.0	54.0	7	12	55.0	64.0	7	12	37.0	38.0	7	6	6	6	34.3	100	112	124	8	7.5	55.0	66.0	5	12	5	6.5 0
48 FT	31	33	10 8	8	7.5	6	6	40.1	55.0	55.0	55.0	8	15	63.0	71.0	8	15	45.0	46.0	7	6	7	6.5	37.5	101	113	125	8	7.5	55.0	66.0	5	12	5	6.5 0
50 FT	32	34	11 8	8	7.5	6	6.5	41.0	56.0	56.0	56.0	7	12	55.0	63.0	7	12	37.0	38.0	7	6	6	6	35.1	102	114	126	8	7	55.0	66.0	5	12	5	7 0

											SPAN	(S)	= 12	2 FT			HEIG	HT (F	IT) =	9 F	T OR	10	FT (	OR 11	FT											
		MEMBE								, and the second	TOP SL	AB E	ARS				,		, and the second				,	Е	BOTTOM	SLAB E	BARS		,	, and the second			₩AL			
DESIGN	I	HICKN	ESS	A1	BARS			J3	3 BARS				Н	1 BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1 '	BARS	B:	2 BARS	,
FILL	TS	BS 1	X TI	SIZE	SPA.	SIZI	E SPA.	C1	HT=9	K2 ' HT=10	'HT=11	, S I ZI	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=9'	K3 HT=10 <b>1</b>	HT=111	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	8 9	5	6	5	7.5	62.3	34.0	34.0	34.0	5	12	117.5	87.5	5	12	31.0	35.0	5	7.5	6	6	79.4	114	126	138	5	6	51.0	54.0	5	12	5	10	12
2 FT	14	10	9 9	5	6	5	8	62.9	34.0	34.0	34.0	5	12	117.5	87.5	5	12	30.0	33.0	5	7	6	6.5	68.6	114	126	138	6	6.5	53.0	56.0	5	12	5	10.5	12
4 FT	11	10	9 9	5	6	6	7	75.1	31.0	31.0	35.0	5	12	82.0	89.0	5	12	34.0	36.0	5	7	6	6	61.3	114	126	138	6	6	52.0	56.0	5	12	5	10	12
6 FT	11	11	9 9	5	6.5	6	7	59.8	31.0	35.0	35.0	6	16	61.0	70.0	6	16	35.0	36.0	5	6.5	6	6	57.5	115	127	139	6	6	50.0	56.0	5	12	5	9.5	12
8 FT	11		9 9	5	6.5	6	7	55.3	31.0	31.0	35.0	6	15	56.0	60.0	6	15	33.0	34.0	5	6	6	6.5	54.5	116	128	140	6	6	49.0	56.0	5	12	5	9	0
10 FT	12	13	9 9	5	6.5	6	6.5	52.5	32.0	32.0	36.0	6	14	54.0	59.0	6	14	33.0	34.0	5	6	6	6.5	52.4	117	129	141	6	6	48.0	56.0	5	12	5	8.5	0
12 FT	13	14	9 9	5	6	6	6.5	50.4	33.0	33.0	37.0	6	14	52.0	58.0	6	14	32.0	34.0	6	8	6	6.5	50.6	118	130	142	6	6	48.0	56.0	5	12	5	8.5	0
14 FT	14	15	9 9	5	6	6	6.5	48.8	34.0	34.0	38.0	6	14	51.0	57.0	6	14	32.0	34.0	6	7.5	6	6.5	49.4	119	131	143	6	6	48.0	56.0	5	12	5	8.5	0
16 FT	15	16 1	0 9	6	8	6	7.5	54.3	35.0	35.0	39.0	6	13	55.0	63.0	6	13	38.0	40.0	6	7	6	7.5	48.5	120	132	144	6	6	47.0	56.0	5	12	5	8	0
18 FT	16	17	1 9	6	8	6	8	54.3	36.0	36.0	36.0	6	13	55.0	62.0	6	13	38.0	40.0	6	7	5	6	45.4	121	133	145	6	6	47.0	56.0	5	12	5	8	0
20 FT	17	18	1 9	6	7.5	6	7.5	53.6	37.0	37.0	41.0	6	13	54.0	62.0	6	13	37.0	40.0	6	6	6	8	47.8	122	134	146	6	6	47.0	56.0	5	12	5	7.5	0
22 FT	18		1 9	6	7	6	6.5	53.3	38.0	38.0	42.0	6	12	54.0	62.0	6	12	37.0	40.0	6	6	6	7.5	47.5	124	136	148	6	6	47.0	57.0	5	12	5	7.5	0
24 FT	19	21 1	2 9	6	6.5	6	7	53.5	39.0	39.0	39.0	6	12	53.0	62.0	6	12	37.0	40.0	7	8	5	6	44.5	125	137	149	7	7.5	50.0	60.0	5	12	5	7	0
26 FT	20		3 9	6	6	6	7.5	53.9	40.0	40.0	40.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7.5	5	6	44.6	126	138	150	7	7.5	50.0	60.0	5	12	5	7	0
28 FT	22	23 1	3 9	6	6	6	7.5	53.5	42.0	42.0		7	15	57.0	66.0	7	15	40.0	43.0	7	7	5	6	44.5	127	139	151	7	7	50.0	60.0	5	12	5	6.5	0
30 FT	23	25 1	3 9	7	7.5	6	7	53.4	43.0	43.0	43.0	7	15	57.0	66.0	7	15	40.0	42.0	7	7	5	6	44.4	129	141	153	7	6.5	50.0	60.0	5	12	5	6.5	0
32 FT	24		3 9	7	7.5	6	6.5	53.3	44.0	44.0	48.0	7	14	57.0	66.0	7	14	40.0	42.0	7	7	6	8.5	47.4	130	142	154	7	6.5	50.0	60.0	5	12	5	6.5	0
34 FT	25	26 1	3 9	7	7	6	6	53.0	45.0	45.0	49.0	7	14	57.0	65.0	7	14	39.0	41.0	7	6	6	7.5	47.3	130	142	154	7	6	50.0	60.0	5	12	5	6.5	0
36 FT	26		4 9	7	7	6	6.5	53.9	46.0	46.0	46.0	7	13	56.0	65.0	7	13	38.0	40.0	7	7	5	6	44.9	132	144	156	7	6	50.0	60.0	5	12	5	6	0
38 FT	26		5 9	7	6.5	6	6.5	54.6	50.0	50.0	50.0	7	13	56.0	65.0	7	13	39.0	41.0	7	6.5	6	8	48.1	133	145	157	7	6	50.0	60.0	5	12	6	8.5	0
40 FT	27		5 9	7	6.5	6	7	53.4	51.0			7	13	56.0	64.0	7	13	38.0	40.0	7	6	6	8	46.9	133	145	157	8	7.5	56.0	66.0	5	12	5	6	0
42 FT		_	5 9	7	6.5	6	6.5	53.4	52.0		52.0	7	12	56.0	64.0	7	12	38.0	39.0	7	6	6	8	47.0	134	146	158	8	7.5	56.0	66.0	5	12	6	8	0
44 FT	29		5 9	7	6	6	6.5	53.4	53.0		53.0	7	12	56.0	63.0	7	12	37.0	39.0	7	6	6	7.5	47.1	135	147	159	8	7.5	56.0	66.0	5	12	6	8	0
46 FT	30		5 9	7	6	6	6.5	53.5	54.0	54.0		7	12	55.0	63.0	7	12	37.0	38.0	7	6	6	7.5	47.4	136	148	160	8	7.5	56.0	66.0	5	12	6	8	0
48 FT			5 9	7	6	6	6	53.5	55.0	55.0	55.0	7	12	55.0	62.0	7	12	37.0	38.0	7	6	6	7	47.5	137	149	161	8	7	56.0	66.0	5	12	6	8	0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

SPAN (S): 12 FEET HE[GHT (HT): 6 THRU 11 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

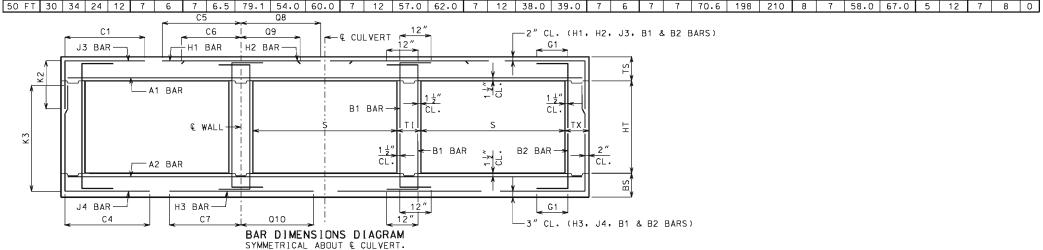
703.87

SHEET NO. 18 OF 27

CONCRETE

											S	PAN	(S)	= 12	FT			HE I GH	T (H)	Γ) =	: 12	FT (	OR 1.	3 FT										
		MEM										TOP	SLAB I	BARS										В	MOTTON	SLAB E	BARS					WAL	L BAR	S
DESIGN		THICK	(NES	S	A1	BARS			Jā	BARS			H1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 E	BARS	В2	BARS
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1		<2 ′HT=13′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	K: HT=12'l		SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA. G1
1 FT	14	10	10	10	5	6	5	7	63.8	34.0	34.0	5	12	118.5	87.5	5	12	32.0	35.0	5	7	6	6.5	89.1	150	162	6	7	55.0	57.0	5	12	5	8.5 12
2 FT	14	10	10	10	5	6	5	7	63.8	34.0	34.0	5	12	118.5	87.5	5	12	31.0	33.0	5	7	6	6	79.6	150	162	6	6.5	54.0	56.0	5	12	5	8 12
4 FT	11	11	10	10	5	6.5	5	6	63.8	31.0	31.0	5	12	118.5	89.0	5	12	34.0	35.0	5	6.5	6	6.5	76.3	151	163	6	6.5	53.0	57.0	5	12	5	8 12
6 FT	11	11	10	10	5	6.5	5	6	71.3	31.0	31.0	6	16	65.0	69.0	6	16	35.0	36.0	5	6.5	6	6	69.1	151	163	6	6	51.0	56.0	5	12	5	8 12
8 FT	11	12	10	10	5	6.5	6	7	65.4	31.0	35.0	6	15	57.0	60.0	6	15	34.0	35.0	5	6	6	6	66.4	152	164	6	6	50.0	56.0	5	12	5	8 0
10 FT	12	13	10	10	5	6.5	6	7	62.9	36.0	36.0	6	15	55.0	58.0	6	15	33.0	34.0	5	6	6	6	63.8	153	165	6	6	49.0	56.0	5	12	5	8 0
12 FT	13	14	11	10	5	6.5	6	7.5	61.1	33.0	37.0	6	14	53.0	57.0	6	14	33.0	34.0	6	8	6	7	62.0	154	166	6	6	49.0	56.0	5	12	5	7.5 0
14 FT	14	15	11	10	5	6	6	7	59.9	38.0	38.0	6	14	51.0	57.0	6	14	32.0	34.0	6	7.5	6	6	60.9	155	167	6	6	48.0	56.0	5	12	5	7.5 0
16 FT	15	16	12	10	6	8	6	7	65.0	39.0	39.0	6	14	56.0	62.0	6	14	38.0	40.0	6	7	6	7	59.9	156	168	6	6	48.0	56.0	5	12	5	7 0
18 FT	16	17	12	10	6	8	6	6.5	64.1	40.0	40.0	6	13	55.0	62.0	6	13	38.0	40.0	6	7	6	6	59.1	157	169	6	6	48.0	56.0	5	12	5	7 0
20 FT	17	18	13	10	6	7.5	6	6.5	63.8	41.0	41.0	6	13	55.0	61.0	6	13	38.0	40.0	6	6	6	7	58.5	158	170	6	6	48.0	56.0	5	12	5	6.5 0
22 FT	18	20	13	10	6	7	6	6	63.3	42.0	42.0	6	13	54.0	61.0	6	13	38.0	40.0	6	6	6	6.5	58.4	160	172	6	6	48.0	56.0	5	12	5	6.5 0
24 FT	19	21	14	10	6	6.5	6	6.5	63.1	39.0	43.0	6	12	54.0	61.0	6	12	37.0	40.0	7	8	6	7	58.0	161	173	7	7.5	51.0	60.0	5	12	5	6 0
26 FT	20	22	14	10	6	6.5	6	6	62.8	44.0	44.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7.5	6	6.5	57.6	162	174	7	7.5	51.0	60.0	5	12	5	6 0
28 FT	21	23	15	10	6	6	6	6	62.9	45.0	45.0	6	12	53.0	61.0	6	12	37.0	40.0	7	7	6	7	57.4	163	175	7	7	51.0	60.0	5	12	6	8 0
30 FT	23	25	15	10	7	7.5	6	6	62.8	47.0	47.0	7	15	57.0	65.0	7	15	40.0	42.0	7	7	6	7	57.5	165	177	7	6.5	51.0	60.0	5	12	6	8 0
32 FT	23	26	16	10	7	7	6	6	63.1	47.0	47.0	7	14	57.0	65.0	7	14	41.0	43.0	7	7	6	7.5	57.5	166	178	7	6.5	51.0	60.0	5	12	6	8 0
34 FT	24	27	16	10	7	7	7	7.5	68.1	48.0	48.0	7	14	57.0	65.0	7	14	40.0	42.0	7	7	6	7	57.5	167	179	7	6	51.0	60.0	5	12	6	8 0
36 FT	25	28	17	10	7	7	6	6	63.6	49.0	49.0	7	14	57.0	64.0	7	14	40.0	42.0	7	7	6	7	57.8	168	180	7	6	51.0	60.0	5	12	6	7.5 0
38 FT	26	29	17	10	7	7	7	7.5	68.6	50.0	50.0	7	13	57.0	64.0	7	13	39.0	41.0	7	6.5	6	7	57.9	169	181	7	6	51.0	60.0	5	12	6	7.5 0
40 FT	27	29	17	10	7	6.5	7	8	66.8	51.0	51.0	7	13	56.0	63.0	7	13	38.0	40.0	7	6	6	7	55.9	169	181	8	7.5	57.0	66.0	5	12	6	7.5 0
42 FT	28	30	17	10	7	6.5	7	7	66.9	52.0	52.0	7	12	56.0	63.0	7	12	38.0	39.0	7	6	6	7	56.0	170	182	8	7.5	57.0	66.0	5	12	6	7.5 0
44 FT	29	31	18	10	7	6	7	7.5	67.8	53.0	53.0	7	12	56.0	62.0	7	12	37.0	38.0	7	6	6	6.5	56.4	171	183	8	7.5	57.0	66.0	5	12	6	7 0
46 FT	29	32	19	10	7	6	7	7.5	68.5	53.0	53.0	7	12	56.0	62.0	7	12	38.0	39.0	7	6	6	6.5	56.8	172	184	8	7	57.0	67.0	5	12	6	6.5 0
48 FT	30	33	19	10	7	6	7	7	68.5	54.0	54.0	7	12	56.0	61.0	7	12	37.0	38.0	7	6	6	6.5	56.9	173	185	8	7	57.0	67.0	5	12	6	6.5 0
50 FT	31	34	19	10	7	6	7	6.5	68.6	55.0	55.0	7	12	56.0	61.0	7	12	37.0	38.0	7	6	6	6.5	57.3	174	186	8	7	57.0	67.0	5	12	6	6.5 0

											S	PAN	(S)	= 12	FΤ			HE I GH	T (H)	Γ) =	: <b>1</b> 4	FT (	OR 15	5 FT											
		MEME										TOP :	SLAB	BARS										Е	воттом	SLAB E	BARS					WAL	L BAF	RS	
ESIGN	T	HICK	NESS		A1	BARS			J3	BARS			H1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1	BARS	B2	BARS	s_
FILL L	TS	BS	ТХ	TI S	SIZE	SPA.	SIZE	SPA.	C1		(2 (HT=15)	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K HT=14'	3 HT=15′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G
1 FT	14	11	10	12	5	6	6	7.5	64.0	34.0	38.0	5	12	119.5	88.5	5	12	32.0	35.0	5	7	6	6	95.5	175	187	5	6	55.0	55.0	5	12	5	8	1
2 FT	14	12	10	12	5	6	6	7	64.0	34.0	38.0	5	12	119.5	88.5	5	12	31.0	34.0	5	7	6	6	95.5	176	188	5	6	54.0	55.0	5	12	5	8	1
4 FT	10	11	12	12	5	6	6	7.5	68.3	34.0	34.0	6	15	121.5	77.0	6	15	37.0	37.0	5	6.5	6	6	86.8	175	187	6	6.5	55.0	57.0	5	11	5	7	1
6 FT	10	12	12	12	5	6.5	6	7	80.0	34.0	34.0	6	15	61.0	61.0	6	15	35.0	35.0	5	6	6	6.5	83.1	176	188	6	6.5	53.0	57.0	5	12	5	7	1
8 FT	11	12	12	12	5	7	6	7.5	76.8	35.0	35.0	6	15	58.0	59.0	6	15	35.0	35.0	5	6	6	6	77.1	176	188	6	6	52.0	55.0	5	12	5	7	
0 FT	12	13	12	12	5	6.5	6	7.5	74.4	36.0	36.0	6	15	56.0	58.0	6	15	34.0	35.0	5	6	6	6	75.5	177	189	6	6	51.0	55.0	5	12	5	6.5	Г
2 FT	13	14	13	12	5	6.5	6	7.5	71.5	37.0	37.0	6	15	54.0	57.0	6	15	34.0	35.0	6	8	6	6	73.0	178	190	6	6	50.0	55.0	5	12	5	6.5	ī
4 FT	14	15	13	12	5	6	6	6.5	70.3	38.0	38.0	6	14	52.0	56.0	6	14	33.0	35.0	6	7.5	6	6	72.0	179	191	6	6	50.0	55.0	5	12	5	6.5	ī
6 FT	15	16	14	12	6	8	6	6.5	74.5	39.0	39.0	6	14	57.0	62.0	6	14	39.0	41.0	6	7	6	6.5	70.3	180	192	6	6	49.0	55.0	5	12	5	6	ī
8 FT	15	17	15	12	6	7.5	6	6.5	72.4	39.0	39.0	6	13	56.0	61.0	6	13	39.0	40.0	6	6.5	6	6.5	69.0	181	193	6	6	49.0	56.0	5	12	6	8	Ĺ
O FT	17	19	15	12	6	7.5	6	6	73.0	41.0	41.0	6	13	56.0	61.0	6	13	39.0	41.0	6	6	0	6	69.6	183	195	6	6	49.0	56.0	5	12	6	8	Ĺ
2 FT	18	20	16	12	6	7	6	6.5	72.8	42.0	42.0	6	13	55.0	61.0	6	13	39.0	41.0	6	6	0	6	68.4	184	196	6	6	49.0	56.0	5	12	6	8	Ĺ
4 FT	19	21	16	12	6	6.5	6	6	72.4	43.0	43.0	6	13	55.0	61.0	6	13	38.0	41.0	7	8	7	7.5	71.1	185	197	7	7.5	52.0	59.0	5	12	6	8	Ĺ
6 FT	20	22	16	12	6	6.5	7	7.5	77.1	44.0	50.0	6	12	55.0	61.0	6	12	38.0	40.0	7	7.5	7	7	70.8	186	198	7	7.5	52.0	60.0	5	12	6	8	L
28 FT	21	23	17	12	6	6	7	7.5	77.1	45.0	51.0	6	12	54.0	60.0	6	12	37.0	40.0	7	6.5	7	7.5	70.5	187	199	7	6.5	52.0	60.0	5	12	6	7.5	
			18	12	6	6	7	7.5	77.3	46.0	46.0	7	15	59.0	65.0	7	15	42.0	44.0	7	7	6	6	67.8	189	201	7	6.5	52.0	60.0	5	12	6	7	L
32 FT	23	26	19	12	7	7.5	7	7.5	77.5	47.0	47.0	7	15	58.0	65.0	7	15	41.0	44.0	7	7	6	6	67.8	190	202	7	6.5	52.0	60.0	5	12	6	6.5	L
	_	27	19	12	7	7.5	7	7	77.6	48.0	48.0	7	14	58.0	65.0	7	14	41.0	43.0	7	7	6	6	67.9	191	203	7	6	52.0	60.0	5	12	6	6.5	L
36 FT	25	28	20	12	7	7	7	7.5	78.1	49.0	49.0	7	14	58.0	64.0	7	14	40.0	42.0	7	7	6	6	68.1	192	204	7	6	52.0	60.0	5	12	6	6.5	L
	26	29	21	12	7	7	7	7.5	78.6	50.0	50.0	7	13	58.0	64.0	7	13	40.0	41.0	7	6.5	6	6	68.3	193	205	7	6	52.0	61.0	5	12	6	6	L
	_	30	21	12	7	6.5	7	7.5	77.1	51.0	51.0	7	13	57.0	63.0	7	13	39.0	40.0	7	6.5	6	6	66.5	194	206	7	6	52.0	61.0	5	12	6	6	L
-				12	7	6	7	7	77.0	51.0	51.0	7	12	57.0	63.0	7	12	40.0	41.0	7	6.5	6	6	66.8	195	207	7	6	52.0	61.0	5	12	6	6	L
	28	_	22	12	7	6.5	7	7	77.6	52.0	58.0	7	12	57.0	63.0	7	12	39.0	40.0	7	6	7	7.5	69.6		207	8	7.5	58.0	67.0	5	12	6	6	L
16 FT	29	32	22	12	7	6	7	6.5	77.9	59.0	59.0	7	12	57.0	62.0	7	12	38.0	40.0	7	6	7	7.5	70.0	196	208	8	7.5	58.0	67.0	5	12	6	6	L
	30	33	23	12	7	6	7	6.5	78.6	54.0	60.0	7	12	57.0	62.0	7	12	38.0	39.0	7	6	7	7.5	70.4	197	209	8	7	58.0	67.0	5	12	7	8	L
O ET	307	3.1	24 T	12	7	6	7	6 5	70 1	54.0	1 60 0	1 7	1 12	57 A	62 0	7	12	39 0	30 0	1 7	6	7	7	70 6	100	210	Ω	7	58 0	67 0	I 5	12	7	Ω	Г



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 12 FEET HE[GHT (HT): 12 THRU 15 FEET

DATE EFFECTIVE: DATE PREPARED:

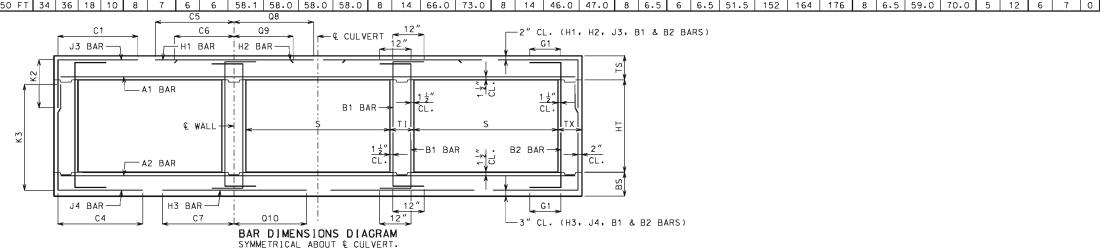
12/01/2011 9/29/2011

703.87

SHEET NO. 19 OF 27

											SPAN	(S)	= 1	3 FT			HE I	GHT (	HT) =	· 7 F	T OF	R 8	FT (	DR 9 I	FT										
		MEMB									TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						₩AL	L BAI	₹S
DESIGN	Т	HICKN	ESS	A1	BARS			J.	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				НЗ	BARS		В1	BARS	B2	BARS
FILL	TS	BS	тх   т і	SIZE	SPA.	SIZE	SPA.	C1	HT=7'	K2   HT=8'	HT=9'	S I ZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	14	9	8 8	5	6	5	8.5	65.8	34.0	34.0	34.0	5	12	125.5	92.5	5	12	34.0	38.0	5	7.5	6	6	60.0	89	101	113	6	6	56.0	59.0	5	12	5	12 12
2 FT	15	10	8 8	6	8	5	8	65.8	31.0	35.0	35.0	6	16	129.5	99.5	6	16	40.0	44.0	5	7	6	6.5	55.5	90	102	114	6	6	54.0	59.0	5	12	5	12 12
4 FT	11	10	8 8	6	8	6	7	56.4	31.0	35.0	35.0	6	14	77.0	97.0	6	14	38.0	40.0	5	7	6	6	49.5	90	102	114	7	6.5	57.0	62.0	5	12	5	12 12
6 FT	11	11	8 8	6	8.5	6	7	49.0	31.0	31.0	35.0	6	13	63.0	75.0	6	13	35.0	37.0	5	6.5	6	7	45.9	91	103	115	7	7	55.0	62.0	5	12	5	12 12
8 FT	12	12	8 8	5	6	5	6	42.0	32.0	32.0	32.0	6	14	58.0	67.0	6	14	34.0	36.0	5	6	6	7	43.3	92	104	116	7	7	54.0	62.0	5	12	5	12 0
10 FT	13	14	8 8	5	6	5	6	39.8	33.0	33.0	33.0	6	13	55.0	63.0	6	13	33.0	36.0	6	8	5	6.5	38.1	94	106	118	6	6	50.0	59.0	5	12	5	12 0
12 FT	14	15	8 8	6	8	5	6	37.9	34.0	34.0	34.0	6	13	53.0	62.0	6	13	33.0	35.0	6	7.5	5	6.5	36.9	95	107	119	6	6	49.0	59.0	5	12	5	12 0
14 FT	15	16	8 8	6	7.5	5	6	41.4	35.0	35.0	35.0	6	12	58.0	67.0	6	12	39.0	41.0	6	7	5	6.5	35.9	96	108	120	6	6	49.0	59.0	5	12	5	10.5 0
16 FT	16	17	8 8	6	7.5	6	8	44.4	36.0	36.0	36.0	6	12	57.0	67.0	6	12	38.0	41.0	6	7	5	6.5	35.1	97	109	121	6	6	49.0	60.0	5	12	5	9.5 0
18 FT	17	18	8 8	6	7	6	7.5	43.5	37.0	37.0	37.0	6	12	56.0	66.0	6	12	38.0	41.0	6	6.5	5	6	34.5	98	110	122	7	7	52.0	63.0	5	12	5	9.5 0
20 FT	18	20	9 8	6	6.5	6	8	44.3	38.0	38.0	38.0	7	15	61.0	71.0	7	15	43.0	46.0	6	6	5	7	34.6	100	112	124	6	6	49.0	60.0	5	12	5	9 0
22 FT	20	21	9 8	6	6.5	6	8	43.4	40.0	40.0	40.0	6	12	55.0	66.0	6	12	38.0	41.0	7	8	5	6.5	34.5	101	113	125	7	7	52.0	63.0	5	12	5	8.5 0
24 FT	21	22	9 8	6	6	6	7.5	43.0	41.0	41.0	41.0	7	15	60.0	71.0	7	15	43.0	46.0	7	7.5	5	6	34.3	102	114	126	7	7	51.0	63.0	5	12	5	8.5 0
26 FT	22	24	10 8	6	6	6	8	43.8	42.0	42.0	42.0	7	15	59.0	70.0	7	15	42.0	46.0	7	7	5	6.5	34.5	104	116	128	7	7	51.0	63.0	5	12	5	8 0
28 FT	23	25	11 8	7	7	5	6	40.5	43.0	43.0	43.0	7	14	59.0	70.0	7	14	42.0	46.0	7	6.5	5	7	34.9	105	117	129	7	6.5	51.0	63.0	5	12	5	8.5 0
30 FT	25	26	11 8	7	7	5	6	40.0	45.0	45.0	45.0	7	14	59.0	70.0	7	14	41.0	44.0	7	6.5	5	6.5	34.9	106	118	130	7	6.5	51.0	63.0	5	12	5	7.5 0
32 FT	26	27	11 8	7	7	5	6	39.8	46.0	46.0	46.0	7	13	59.0	69.0	7	13	40.0	43.0	7	6	5	6	34.8	107	119	131	7	6	51.0	63.0	5	12	5	7.5 0
34 FT	27	29	11 8	7	6.5	6	8	43.9	47.0	47.0	51.0	7	13	58.0	69.0	7	13	40.0	42.0	7	6.5	6	7.5	37.9	109	121	133	8	7.5	57.0	69.0	5	12	5	7.5 0
36 FT	28	30	11 8	7	6.5	6	7.5	43.9	52.0	52.0	52.0	7	12	58.0	68.0	7	12	40.0	42.0	7	6	6	7	37.9	110	122	134	8	7.5	57.0	69.0	5	12	5	7.5 0
38 FT	29	31	11 8	7	6	6	6.5	43.9	53.0	53.0	53.0	7	12	58.0	68.0	7	12	39.0	41.0	7	6	6	7	38.0	111	123	135	8	7	57.0	69.0	5	12	5	7 0
40 FT	30	32	12 8	7	6	6	7.5	44.8	54.0	54.0	54.0	7	12	58.0	68.0	7	12	38.0	40.0	7	6	6	7.5	38.5	112	124	136	8	7	57.0	70.0	5	12	5	7 0
42 FT	31	33	12 8	8	7.5	6	7.5	43.8	55.0	55.0	55.0	8	15	66.0	75.0	8	15	46.0	47.0	7	6	6	7	37.6	113	125	137	8	7	57.0	69.0	5	12	5	7 0
44 FT	32	34	12 8	8	7.5	6	7	43.9	56.0	56.0	56.0	8	14	65.0	74.0	8	14	45.0	47.0	7	6	6	7	37.8	114	126	138	8	7	57.0	69.0	5	12	5	7 0
46 FT	32	35	12 8	8	7	6	7	43.9	56.0	56.0	56.0	8	14	65.0	74.0	8	14	46.0	47.0	7	6	6	6.5	37.8	115	127	139	8	7	57.0	69.0	5	12	5	7 0
48 FT	33	35	12 8	8	7	6	7	43.9	57.0	57.0	57.0	8	14	65.0	74.0	8	14	45.0	47.0	8	7	6	6.5	37.9	115	127	139	8	6.5	57.0	69.0	5	12	5	6.5 0
50 FT	34	36	12 8	8	7	6	6.5	43.9	58.0	58.0	58.0	8	14	65.0	73.0	8	14	45.0	46.0	8	7	6	6.5	38.1	116	128	140	8	6.5	57.0	69.0	5	12	5	6 0

												SPAN I	(S)	= 13	FT			HEIG	HT (H	IT) =	10	FT O	R 11	1 FT	OR 1	2 FT										
		MEMBI										TOP SL	AB B	٩RS											[	BOTTOM	SLAB E	BARS						₩AL	L BAF	RS
DESIGN	1	HICKN	IESS		A1 E	BARS			J3	BARS				H1	BARS			H2	BARS		Α2	BARS			J4	BARS				Н3	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS .	тх	TIS	SIZE	SPA.	SIZE	SPA.	C1	HT=10	K2 HT=11	'HT=12'	, S I ZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	K3 HT=11 <b>1</b>	HT=12′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	14	10	9	10	5	6	5	7	66.6	34.0	34.0	34.0	5	12	126.5	93.5	5	12	35.0	38.0	5	7	6	6	81.5	126	138	150	6	6.5	57.0	60.0	5	12	5	9 12
2 FT	15	10	10	10	6	8	5	7.5	67.3	35.0	35.0	35.0	6	16	130.5	100.5	6	16	41.0	44.0	5	7	6	6	70.1	126	138	150	6	6	56.0	58.0	5	12	5	9.5 12
4 FT	11	10	10	10	6	8	5	6	72.3	31.0	31.0	31.0	6	15	82.0	97.0	6	15	38.0	39.0	5	7	6	6	64.6	126	138	150	7	6.5	58.0	61.0	5	9.5	5	9 12
6 FT	11	11	10	10	5	6	5	6	60.5	31.0	31.0	31.0	6	14	64.0	71.0	6	14	36.0	37.0	5	6.5	6	6	61.0	127	139	151	7	6.5	57.0	61.0	5	12	5	9 12
8 FT	12	13	10	10	5	6	5	6	56.8	32.0	32.0	32.0	6	14	60.0	64.0	6	14	35.0	36.0	5	6	6	6.5	59.1	129	141	153	6	6	52.0	59.0	5	12	5	8.5 0
10 FT	13	14	10	10	5	6	6	7	56.9	33.0	33.0	37.0	6	13	57.0	62.0	6	13	34.0	36.0	6	8	6	6.5	56.8	130	142	154	6	6	51.0	59.0	5	12	5	8 0
12 FT	14	15	10	10	5	6	6	6.5	54.6	34.0	34.0	38.0	6	13	55.0	61.0	6	13	34.0	36.0	6	7.5	6	6.5	54.9	131	143	155	6	6	51.0	59.0	5	12	5	8 0
14 FT	15	16	10	10	6	8	6	6.5	58.9	35.0	35.0	39.0	6	13	60.0	66.0	6	13	39.0	42.0	6	7	6	6	53.5	132	144	156	6	6	50.0	59.0	5	12	5	8 0
16 FT	16	17	11	10	6	7.5	6	7	58.0	36.0	36.0	40.0	6	12	58.0	66.0	6	12	39.0	42.0	6	7	6	7.5	52.5	133	145	157	6	6	50.0	59.0	5	12	5	7.5 0
18 FT	17	18	12	10	6	7.5	6	7	57.9	37.0	37.0	41.0	6	12	58.0	66.0	6	12	39.0	42.0	6	6	6	7.5	52.0	134	146	158	7	7	53.0	62.0	5	12	5	7 0
20 FT	18	20	12	10	6	7	6	6.5	57.3	38.0	38.0	42.0	6	12	57.0	65.0	6	12	39.0	42.0	6	6	6	7.5	51.5	136	148	160	6	6	50.0	60.0	5	12	5	7 0
22 FT	19	21	12	10	6	6	6	6.5	56.8	39.0	39.0	43.0	7	15	62.0	70.0	7	15	44.0	47.0	7	8	6	7	51.0	137	149	161	7	7	53.0	63.0	5	12	5	7 0
24 FT	21	22	13	10	6	6	6	6.5	56.9	41.0	41.0	45.0	6	12	56.0	65.0	6	12	38.0	42.0	7	7	6	7.5	51.1	138	150	162	7	7	53.0	63.0	5	12	5	6.5 0
26 FT		_	13	10	6	6	6	6.5	56.6	42.0	42.0	46.0	7	15	60.0	70.0	7	15	43.0	46.0	7	7	6	7.5	50.9	140	152	164	7	7	53.0	63.0	5	12	5	6.5 0
28 FT	23	25	14	10	7	7.5	6	6.5	57.0	43.0	43.0	47.0	7	15	60.0	69.0	7	15	43.0	46.0	7	6.5	6	8	51.0	141	153	165	7	6.5	53.0	63.0	5	12	5	6 0
30 FT		26	14	10	7	7	6	6.5	56.6	44.0	44.0	48.0	7	14	60.0	69.0	7	14	42.0	45.0	7	6.5	6	7.5	50.8	142	154	166	7	6.5	53.0	63.0	5	12	5	6 0
32 FT	26	28	14	10	7	7	6	6	56.5	46.0	46.0	50.0	7	13	59.0	69.0	7	13	41.0	43.0	7	6.5	6	7.5	50.8	144	156	168	7	6	53.0	63.0	5	12	5	6 0
34 FT	27	29	15	10	7	6.5	6	6.5	57.1	51.0	51.0	51.0	7	13	59.0	68.0	7	13	40.0	43.0	7	6.5	6	8	51.1	145	157	169	8	7.5	59.0	70.0	5	12	6	8 0
36 FT			15	10	7	6.5	6	6	57.1	52.0	52.0		7	12	59.0	68.0	7	12	40.0	42.0	7	6	6	7.5	51.1	146	158	170	8	7.5	59.0	70.0	5	12	6	8 0
38 FT			16	10	7	6	6	6	57.8	53.0	53.0	53.0	7	12	59.0	68.0	7	12	39.0	41.0	7	6	6	7.5	51.6	147	159	171	8	7	59.0	70.0	5	12	6	8 0
40 FT	30		16	10	7	6	6	6	57.8	54.0	54.0	54.0	7	12	59.0	67.0	7	12	39.0	40.0	7	6	6	7.5	51.6	148	160	172	8	7	59.0	70.0	5	12	6	8 0
42 FT	30	33	17	10	7	6	6	6	58.5	54.0	54.0	54.0	7	12	59.0	67.0	7	12	40.0	41.0	7	6	6	7	51.9	149	161	173	8	7	59.0	70.0	5	12	6	7.5 0
44 FT	_	34	17	10	8	7.5	6	6	57.4	55.0	55.0		8	15	66.0	74.0	8	15	47.0	48.0	7	6	6	7	50.8	150	162	174	8	7	59.0	70.0	5	12	6	7.5 0
46 FT		35	17	10	8	7.5	6	6	57.4	56.0	56.0	56.0	8	14	66.0	74.0	8	14	46.0	48.0	8	7.5	6	6.5	50.9	151	163	175	8	7	59.0	70.0	5	12	6	7.5 0
48 FT	33			10	8	7	6	6	57.4	57.0	57.0		8	14	66.0	73.0	8	14	46.0	47.0	8	7.5	6	6.5	51.1	152	164	176	8	6.5	59.0	70.0	5	12	6	7.5 0
50 FT	3.4	36	18	10	8	7	6	6	58 1	58 0	58 O	58.0	β	14	66.0	73 0	В	1.4	16 0	47.0	8	6 5	6	6 5	51.5	152	164	176	l g	6 5	59 N	70.0	1 5	12	6	7 0



J IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS.

AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT DR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 7 THRU 12 FEET

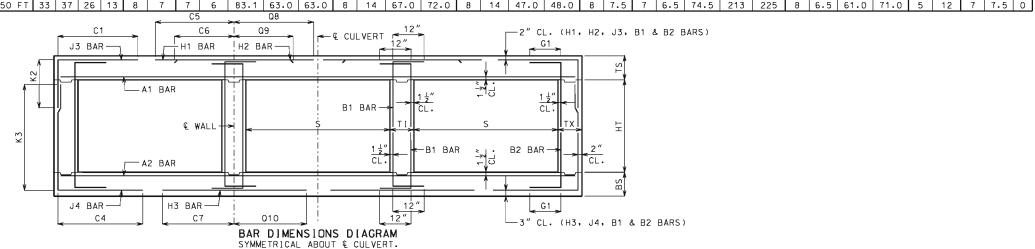
12/01/2011 DATE EFFECTIVE: 9/29/2011 DATE PREPARED:

703.87

SHEET NO. 20 OF 27

											S	PAN	(S)	= 13	FT			HE I GH	T (HT	`) =	: 13	FT (	OR 14	1 FT										
		MEM										TOP	SLAB	BARS										E	BOTTOM	SLAB E	BARS					WAL		
DESIGN	1	THICK	NES:	S	A1	BARS			J.	BARS			H1	BARS		<u> </u>	H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 E	BARS	B2	BARS
FILL	TS	BS	ΤX	ΤI	SIZE	SPA.	SIZE	SPA.	C1		(2 (HT=14)	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K HT=13'	3 HT=14′	SIZE	SPA.	C7	010	S I ZE	SPA.	SIZE	SPA. G1
1 FT	14	11	10	11	5	6	5	6	67.5	34.0	34.0	5	12	127.5	94.5	5	12	35.0	38.0	5	7	6	6.5	100.1	163	175	5	6	56.0	58.0	5	12	5	8 12
2 FT	15	11	10	11	6	8	5	6	67.5	35.0	35.0	6	16	131.5	101.5	6	16	41.0	44.0	5	6.5	6	6	88.9	163	175	6	6.5	57.0	60.0	5	12	5	8 12
4 FT	11	11	11	11	6	8	5	6	68.1	31.0	31.0	6	15	127.5	92.0	6	15	38.0	39.0	5	6.5	6	6	78.6	163	175	6	6	56.0	60.0	5	12	5	7.5 12
6 FT	11	12	11	11	5	6	6	7.5	75.9	31.0	35.0	6	14	65.0	69.0	6	14	36.0	37.0	5	6	6	6.5	74.6	164	176	6	6	54.0	59.0	5	12	5	7.5 12
8 FT	12	13	11	11	5	6	6	7.5	70.1	32.0	36.0	6	14	61.0	64.0	6	14	35.0	36.0	5	6	6	6.5	70.9	165	177	6	6	53.0	59.0	5	12	5	7.5 0
10 FT	12	14	12	11	5	6	6	7.5	65.9	36.0	36.0	6	12	58.0	61.0	6	12	35.0	35.0	6	8	6	7	67.9	166	178	6	6	52.0	59.0	5	12	5	7 0
12 FT	13	15	12	11	6	8	6	7	64.4	37.0	37.0	6	12	56.0	60.0	6	12	34.0	35.0	6	7.5	6	7	66.3	167	179	6	6	52.0	59.0	5	12	5	7 0
14 FT	15	16	12	11	6	8	6	6.5	69.9	39.0	39.0	6	13	60.0	66.0	6	13	40.0	42.0	6	7	6	6	64.9	168	180	6	6	51.0	59.0	5	12	5	7 0
16 FT	16	17	13	11	6	8	6	6.5	68.9	40.0	40.0	6	13	59.0	65.0	6	13	40.0	42.0	6	7	6	6.5	63.8	169	181	6	6	51.0	59.0	5	12	5	6.5 0
18 FT	17	19	14	11	6	7.5	6	6.5	68.3	41.0	41.0	6	12	58.0	65.0	6	12	40.0	42.0	6	6	6	6.5	63.5	171	183	6	6	51.0	60.0	5	12	5	6 0
20 FT	18	20	14	11	6	7	6	6	67.5	42.0	42.0	6	12	58.0	65.0	6	12	39.0	42.0	6	6	6	6.5	62.8	172	184	6	6	51.0	60.0	5	12	5	6 0
22 FT	19	21	14	11	6	6.5	6	6	66.9	43.0	43.0	6	12	57.0	65.0	6	12	39.0	42.0	7	8	6	6	62.1	173	185	7	7	54.0	63.0	5	12	5	6 0
24 FT	20	22	16	11	6	6	6	6	67.3	44.0	44.0	7	15	62.0	69.0	7	15	44.0	47.0	7	7	6	6.5	61.8	174	186	7	7	54.0	63.0	5	12	6	8 0
26 FT	22	24	16	11	6	6	6	6	67.1	46.0	46.0	7	15	61.0	69.0	7	15	43.0	46.0	7	7	6	7	61.8	176	188	7	7	54.0	63.0	5	12	6	8 0
28 FT	23	25	16	11	7	7.5	7	8	71.6	47.0	47.0	7	15	61.0	69.0	7	15	43.0	46.0	7	6.5	6	6.5	61.4	177	189	7	6.5	54.0	63.0	5	12	6	8 0
30 FT	24	26	16	11	7	7.5	7	7	71.3	48.0	48.0	7	14	60.0	69.0	7	14	42.0	45.0	7	6.5	6	6	61.0	178	190	7	6.5	54.0	63.0	5	12	6	8 0
32 FT	25	28	17	11	7	7	7	7.5	71.6	49.0	49.0	7	14	60.0	68.0	7	14	42.0	45.0	7	6.5	6	6.5	61.1	180	192	7	6	54.0	64.0	5	12	6	7.5 0
34 FT	26	29	17	11	7	6.5	7	6.5	71.4	50.0	50.0	7	13	60.0	68.0	7	13	42.0	44.0	7	6.5	6	6.5	61.0	181	193	8	7.5	60.0	70.0	5	12	6	7.5 0
36 FT	27	30	18	11	7	6.5	7	7	72.0	51.0	51.0	7	13	60.0	68.0	7	13	41.0	43.0	7	6	6	6.5	61.3	182	194	8	7.5	60.0	70.0	5	12	6	7 0
38 FT	28	31	19	11	7	6.5	7	7.5	72.5	52.0	52.0	7	12	59.0	67.0	7	12	41.0	43.0	7	6	6	6.5	61.5	183	195	8	7	60.0	70.0	5	12	6	6.5 0
40 FT	29	32	19	11	7	6	7	6.5	72.6	53.0	53.0	7	12	59.0	67.0	7	12	40.0	42.0	7	6	6	6	61.5	184	196	8	7	60.0	70.0	5	12	6	6.5 0
42 FT	30	33	20	11	7	6	7	7	73.3	54.0	54.0	7	12	59.0	66.0	7	12	39.0	41.0	7	6	6	6	61.9	185	197	8	7	60.0	70.0	5	12	6	6.5 0
44 FT	31	34	20	11	8	7.5	7	7	71.6	55.0	55.0	8	15	67.0	73.0	8	15	47.0	48.0	7	6	6	6	60.1	186	198	8	7	60.0	70.0	5	12	6	6.5 0
46 FT	32	35	20	11	8	7.5	7	6.5	71.6	56.0	56.0	8	15	67.0	73.0	8	15	46.0	48.0	8	7.5	6	6	60.3	187	199	8	7	60.0	70.0	5	12	6	6.5 0
48 FT	32	36	21	11	8	7	7	7	72.4	56.0	56.0	8	14	67.0	73.0	8	14	47.0	48.0	8	7.5	6	6	60.5	188	200	8	6.5	60.0	70.0	5	12	6	6 0
50 FT	33	36	22	11	8	7	7	7	73.1	57.0	63.0	8	14	66.0	72.0	8	14	46.0	47.0	8	6.5	7	7.5	63.8	188	200	8	6.5	60.0	70.0	5	12	6	6 0

											S	PAN	(5)	= 13	FT			HE I GH	IT (HI	·) =	= 15	FT (	OR 1	6 FT											
		MEMB										TOP :	SLAB	BARS										Е	MOTTOE	SLAB E	3ARS					WAL	L BA	.RS	
DESIGN	'	HICK	NESS	· [	A1 B	ARS			J3	3 BARS			H1	BARS			H2	2 BARS		A2	BARS			J4	BARS			Н3	BARS		B1 E	BARS	B2	2 BARS	,
FILL	TS	BS	ТХ	ΤI	SIZES	SPA.	SIZE	SPA.	C1	HT=15	(2 'HT=16	, SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	K3 HT=15'H		SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA.	G 1
1 FT	14	11	12	13	5	6	5	6	69.0	34.0	34.0	5	12	128.5	95.5	5	12	35.0	37.0	5	6.5	6	6.5	103.3	187	199	6	7	60.0	61.0	5	10.5	5	7	12
2 FT	15	11	12	13	6	8	6	8	72.0	35.0	39.0	6	16	135.5	102.5	6	16	41.0	44.0	5	6.5	6	6	95.4	187	199	6	6.5	58.0	59.0	5	12	5	7	12
4 FT	11	11	12	13	6	8	6	7	72.0	35.0	35.0	6	15	130.5	82.0	6	15	39.0	39.0	5	6.5	7	6	92.5	187	199	6	6	57.0	59.0	5	12	5	6.5	12
6 FT	11	12	12	13	5	6	6	6.5	90.4	35.0	35.0	6	14	65.0	66.0	6	14	37.0	37.0	5	6	7	6	88.9	188	200	6	6	56.0	59.0	5	12	5	6.5	12
8 FT	11	13	13	13	5	6	6	6.5	78.1	35.0	35.0	6	13	60.0	62.0	6	13	36.0	36.0	5	6	6	6	82.4	189	201	6	6	55.0	59.0	5	12	5	6.5	0
10 FT	12	14	13	13	5	6	6	6.5	76.0	36.0	36.0	6	13	58.0	60.0	6	13	35.0	36.0	6	8	6	6	80.4	190	202	6	6	54.0	59.0	5	12	5	6	0
12 FT	13	15	14	13	5	6	6	6.5	73.3	37.0	37.0	6	12	57.0	59.0	6	12	35.0	36.0	6	7.5	6	6	77.5	191	203	6	6	53.0	59.0	5	12	5	6	0
14 FT	14	16	14	13	6	8	6	6	72.3	38.0	38.0	6	12	55.0	59.0	6	12	35.0	36.0	6	7	6	6	76.3	192	204	7	7	55.0	62.0	5	12	5	6	0
16 FT	15	17	16	13	6	7.5	6	6.5	76.6	39.0	39.0	6	12	60.0	64.0	6	12	41.0	42.0	6	6.5	6	6.5	73.3	193	205	7	7	55.0	62.0	5	12	6	8	0
18 FT	16	19	16	13	6	7	6	6	76.3	40.0	40.0	6	12	59.0	64.0	6	12	40.0	42.0	6	6	6	6	74.1	195	207	6	6	52.0	60.0	5	12	6	8	0
20 FT	18	20	16	13	6	7	6	6	76.8	42.0	42.0	6	12	59.0	64.0	6	12	40.0	42.0	6	6	6	6	73.0	196	208	6	6	52.0	60.0	5	12	6	8	0
22 FT	19	21	17	13	6 (	6.5	6	6	76.4	43.0	43.0	6	12	58.0	64.0	6	12	40.0	42.0	7	7.5	7	7.5	75.1	197	209	7	7	55.0	63.0	5	12	6	7.5	0
24 FT	20	23	17	13	6 (	6.5	7	7.5	81.1	44.0	50.0	6	12	58.0	64.0	6	12	40.0	42.0	7	7	7	7	75.4	199	211	7	7	55.0	63.0	5	12	6	7.5	0
26 FT	22	24	18	13	6	6	7	7.5	81.5	46.0	52.0	7	15	62.0	69.0	7	15	44.0	46.0	7	7	7	7.5	74.9	200	212	7	7	55.0	63.0	5	12	6	7	0
28 FT	23	25	18	13	7	7.5	7	6.5	81.3	47.0	53.0	7	15	62.0	69.0	7	15	43.0	46.0	7	6.5	7	6.5	74.6	201	213	7	6.5	55.0	63.0	5	12	6	7	0
30 FT	24	26	19	13	7	7.5	7	7	81.3	48.0	54.0	7	14	61.0	69.0	7	14	43.0	46.0	7	6.5	7	7	74.4	202	214	7	6.5	55.0	63.0	5	12	6	6.5	0
32 FT	25	28	20	13	7	7	7	7	81.4	49.0	55.0	7	14	61.0	68.0	7	14	42.0	45.0	7	6.5	7	7.5	74.6	204	216	7	6	55.0	64.0	5	12	6	6.5	0
34 FT	26	29	21	13	7	7	7	7	81.6	50.0	56.0	7	13	61.0	68.0	7	13	42.0	44.0	7	6.5	7	7.5	74.5	205	217	8	7.5	61.0	70.0	5	12	6	6	0
36 FT	27	30	22	13	7 (	6.5	7	7	82.0	57.0	57.0	7	13	60.0	68.0	7	13	42.0	44.0	7	6	7	7.5	74.8	206	218	8	7.5	61.0	70.0	5	12	6	6	0
38 FT	28	31	22	13	7 (	6.5	7	6.5	82.1	58.0	58.0	7	12	60.0	67.0	7	12	41.0	43.0	7	6	7	7	74.8	207	219	8	7	61.0	70.0	5	12	6	6	0
40 FT	29	32	23	13	7	6	7	6.5	82.6	59.0	59.0	7	12	60.0	67.0	7	12	41.0	42.0	7	6	7	7	75.0	208	220	8	7	61.0	70.0	5	12	7	7.5	0
42 FT	30	33	24	13	7	6	7	6.5	83.3	60.0	60.0	7	12	60.0	66.0	7	12	40.0	42.0	7	6	7	7	75.3	209	221	8	7	61.0	70.0	5	12	7	7.5	0
44 FT	31	34	24	13	7	6	7	7	81.8	61.0	61.0	8	15	68.0	74.0	8	15	47.0	49.0	7	6	7	7	73.5	210	222	8	7	61.0	70.0	5	12	7	7.5	0
46 FT	31	35	24	13	8	7.5	7	6	81.6	61.0	61.0	8	15	68.0	74.0	8	15	48.0	49.0	8	7.5	7	7	73.8	211	223	8	7	61.0	70.0	5	12	7	7.5	0
48 FT	32		25	13		7.5	7	6	82.4	62.0	62.0	8	14	67.0	73.0	8	14	47.0	49.0	8	7.5	7	7	74.1	212	224	8	6.5	61.0	71.0	5	12	7	7.5	0
50 FT	33	37	26	13	Я	7	7	6	83.1	63.0	63 O	В	14	67.0	72.0	Я	14	47.0	48.0	Я	7.5	7	6.5	74.5	213	225	В	6.5	61 0	71.0	5	12	7	7.5	Ω



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 13 FEET HE[GHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

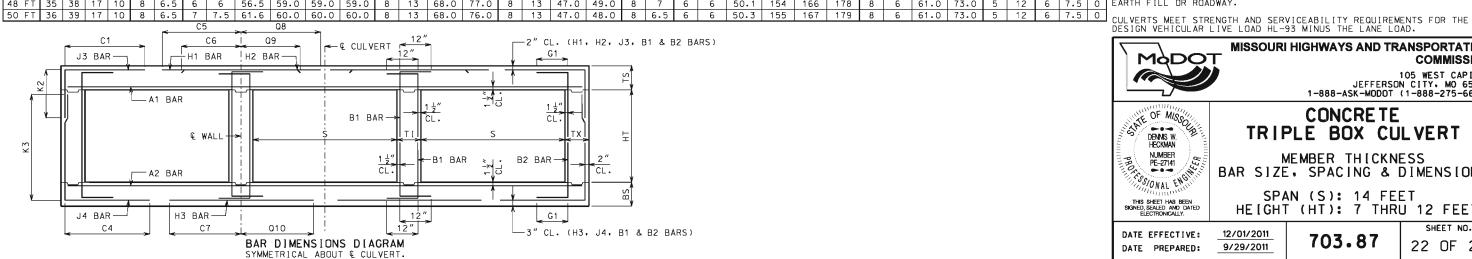
12/01/2011 9/29/2011

703.87

SHEET NO. 21 OF 27

											SPAN	(S)	= 1	4 FT			HE I	GHT (	HT) =	· 7 I	FT O	R 8	FT (	OR 9	FT										
		MEMB	ER								TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						₩AL	L BA	RS
DESIGN	T	HICK	NESS	A1	BARS			J.	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				НЗ	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS	тх Т	I SIZ	E SPA.	SIZ	E SPA.	C1	HT=7'	K2   HT=8'	HT=9'	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=7'	K3 HT=8'	HT=9'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	14	10	8 8	6	8.5	5	8.5	69.3	34.0	34.0	34.0	5	12	133.5	98.5	5	12	39.0	43.0	5	7	6	7	60.9	90	102	114	6	6.5	58.0	63.0	5	12	5	12 12
2 FT	15	10	8 8	6	8	5	8	69.3	35.0	35.0	35.0	6	16	137.5	105.5	6	16	45.0	49.0	5	7	6	6	54.8	90	102	114	7	7	60.0	64.0	5	12	5	12 12
4 FT	12	11	8 8	6	7.5	5	6	52.4	32.0	32.0	32.0	6	14	80.0	103.0	6	14	39.0	42.0	5	6.5	6	7	49.1	91	103	115	6	6	56.0	62.0	5	12	5	12 12
6 FT	12	12	8 8	6	8	6	7.5	48.9	32.0	32.0	32.0	6	13	66.0	81.0	6	13	37.0	39.0	5	6	5	6	42.1	92	104	116	7	7	57.0	65.0	5	12	5	12 12
8 FT	12	13	8 8	6	7.5	6	7	45.5	32.0	32.0	32.0	6	12	61.0	69.0	6	12	35.0	37.0	6	8.5	5	6	39.1	93	105	117	7	7	56.0	66.0	5	12	5	12 0
10 FT	13	14	9 8	6	7	5	6	41.3	33.0	33.0	33.0	7	15	61.0	69.0	7	15	38.0	40.0	6	8	5	7	38.4	94	106	118	7	6.5	55.0	65.0	5	12	5	12 0
12 FT	15	16	9 8	6	7.5	5	6.5	43.5	35.0	35.0	35.0	6	12	62.0	71.0	6	12	40.0	43.0	6	7	5	8	36.8	96	108	120	6	6	52.0	63.0	5	12	5	12 0
14 FT	16	17	9 8	6	7	5	6	41.9	36.0	36.0	36.0	6	12	61.0	70.0	6	12	40.0	43.0	6	7	5	7.5	35.8	97	109	121	7	7	54.0	66.0	5	12	5	12 0
16 FT	17	18	9 8	6	7	5	6	40.8	37.0	37.0	37.0	7	15	65.0	75.0	7	15	44.0	48.0	6	6.5	5	7	34.9	98	110	122	7	7	54.0	66.0	5	12	5	12 0
18 FT	18	20	9 8	6	6.5	6	8	44.0	38.0	38.0	38.0	7	15	64.0	75.0	7	15	44.0	47.0	6	6	5	7	34.0	100	112	124	7	7	54.0	66.0	5	12	5	10 0
20 FT	20	21	9 8	6	6.5	5	6	38.9	40.0	40.0	40.0	7	15	63.0	75.0	7	15	44.0	48.0	7	8	5	6.5	33.9	101	113	125	7	7	54.0	66.0	5	12	5	9 0
22 FT	21	22	9 8	6	6	6	8	42.4	41.0	41.0	41.0	7	14	63.0	74.0	7	14	44.0	47.0	7	7	5	6	33.5	102	114	126	7	6.5	54.0	66.0	5	12	5	8.5 0
24 FT	23	24	9 8	7	7.5	6	7	42.0	47.0	47.0	47.0	7	15	62.0	74.0	7	15	44.0	47.0	7	7	6	7	36.4	104	116	128	7	7	54.0	66.0	5	12	5	8.5 0
26 FT	24	25	9 8	7	7.5	6	7	41.6	48.0	48.0	48.0	7	14	62.0	74.0	7	14	43.0	47.0	7	6.5	6	7	36.1	105	117	129	7	6.5	54.0	66.0	5	12	5	8.5 0
28 FT	25	26	9 8	7	7	6	6	41.4	49.0	49.0	49.0	7	14	61.0	73.0	7	14	43.0	47.0	7	6	6	6.5	35.9	106	118	130	7	6	54.0	66.0	5	12	5	7.5 0
30 FT	27	28	10 8	7	6.5	6	7	42.3	51.0	51.0	51.0	7	13	61.0	73.0	7	13	42.0	45.0	7	6	6	7	36.5	108	120	132	7	6	54.0	67.0	5	12	5	8 0
32 FT	28	29	10 8	7	6.5	6	6.5	42.0	52.0	52.0	52.0	7	12	61.0	73.0	7	12	41.0	44.0	7	6	6	6.5	36.4	109	121	133	8	7.5	60.0	73.0	5	12	5	7.5 0
34 FT	29	30	10 8	7	6	6	6	41.9	53.0	53.0	53.0	7	12	61.0	72.0	7	12	41.0	44.0	8	7	6	6.5	36.4	110	122	134	8	7	60.0	73.0	5	12	5	7 0
36 FT	30	32	11 8	7	6	6	7	42.9	54.0	54.0	54.0	7	12	61.0	72.0	7	12	41.0	43.0	7	6	6	6.5	36.9	112	124	136	8	7	60.0	73.0	5	12	5	7.5 0
38 FT	31	33	11 8	8	7.5	6	6.5	42.9	55.0	55.0	55.0	8	15	68.0	79.0	8	15	48.0	51.0	8	7.5	6	6.5	37.0	113	125	137	8	6.5	60.0	73.0	5	12	5	7 0
40 FT	32	34	11 8	8	7.5	6	6.5	42.9	56.0	56.0	56.0	8	14	68.0	79.0	8	14	48.0	50.0	8	7.5	6	6	37.1	114	126	138	8	6.5	60.0	73.0	5	12	5	6.5 0
42 FT	33	35	12 8	8	7	6	7	43.8	57.0	57.0	57.0	8	14	68.0	78.0	8	14	47.0	49.0	8	7	6	6.5	37.6	115	127	139	8	6.5	60.0	73.0	5	12	5	7 0
44 FT	34	36	12 8	8	7	6	6.5	43.8	58.0	58.0	58.0	8	14	68.0	78.0	8	14	47.0	48.0	8	7	6	6.5	37.8	116	128	140	8	6	60.0	73.0	5	12	5	6.5 0
46 FT	35	37	12 8	8	6.5	6	6.5	42.9	59.0	59.0	59.0	8	13	67.0	77.0	8	13	46.0	47.0	8	7	6	6.5	37.0	117	129	141	8	6	60.0	73.0	5	12	5	6.5 0
48 FT	36	38	12 8	8	6.5	6	6.5	43.0	60.0	60.0	60.0	8	13	67.0	76.0	8	13	46.0	47.0	8	7	6	6	37.1	118	130	142	8	6	60.0	73.0	5	12	5	6 0
50 FT	37	39	12 8	8	6.5	6	6	43.1	61.0	61.0	61.0	8	13	67.0	75.0	8	13	46.0	47.0	8	7	6	6	37.4	119	131	143	8	6	60.0	73.0	5	12	5	6 0

											SPAN (	(S)	= 14	1 FT			HEIG	HT (F	IT) =	10	FT OF	₹ 11	FT	OR 1:	2 FT											
		MBER									TOP SL	AB B	ARS											В	BOTTOM	SLAB E	BARS						₩AL	L BA	RS	
DES I GN	THIC	KNESS	· [	A1 [	BARS			J3	BARS				Н	1 BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	B:	2 BARS	3
FILL	S BS	ТХ	TIS	IZE	SPA.	SIZE	SPA.	C1	HT=10	K2 'HT=11	′ HT=12′	S I ZE	SPA.	C5	08	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=10'	K3 HT=11 <b>1</b>	HT=12′	SIZE	SPA.	C7	Q10	SIZE	SPA.	S I ZE	SPA.	G
1 FT 14	1 10	9	10	6	8.5	5	7	70.3	34.0	34.0	34.0	5	12	134.5	99.5	5	12	39.0	43.0	5	7	6	6	80.1	126	138	150	6	6	60.0	63.0	5	10.5	5	9	1
2 FT 15	5 11	9	10	6	8	5	7	70.3	35.0	35.0	35.0	6	16	138.5	106.5	6	16	45.0	48.0	5	6.5	6	6	73.6	127	139	151	6	6.5	59.0	62.0	5	12	5	9	1
4 FT 1	1 11	11	10	6	7	5	6	66.6	31.0	31.0	31.0	6	13	81.0	94.0	6	13	39.0	40.0	5	6.5	5	6	61.8	127	139	151	7	7	61.0	65.0	5	9.5	5	10	1
6 FT 12	2 12	11	10	6	8	5	6.5	60.6	32.0	32.0	32.0	6	13	67.0	75.0	6	13	37.0	39.0	5	6	5	6	57.3	128	140	152	7	7	59.0	65.0	5	12	5	10.5	1
8 FT 12	2 13	11	10	6	8	5	6	56.3	32.0	32.0	32.0	6	12	62.0	67.0	6	12	36.0	37.0	5	6	6	7	57.4	129	141	153	7	6.5	57.0	65.0	5	12	5	10	Г
10 FT 13	3 14	11	10	6	7.5	6	8	56.3	33.0	33.0	37.0	6	12	59.0	65.0	6	12	35.0	37.0	6	7.5	6	7	55.0	130	142	154	7	6.5	57.0	65.0	5	12	5	9.5	Г
12 FT 14	1 16	12	10	6	7.5	6	8	54.9	34.0	34.0	34.0	7	15	61.0	67.0	7	15	38.0	39.0	6	7	5	6	50.9	132	144	156	7	7	56.0	66.0	5	12	5	9.5	Γ
14 FT 16	5 17	12	10	6	7.5	6	8	59.3	36.0	36.0	36.0	6	12	62.0	70.0	6	12	41.0	43.0	6	7	5	6	49.9	133	145	157	7	7	56.0	66.0	5	12	5	9	Ī
6 FT 1	7 18	12	10	6	7	6	7.5	58.1	37.0	37.0	41.0	7	16	66.0	74.0	7	16	45.0	48.0	6	6.5	6	8	52.0	134	146	158	7	7	56.0	66.0	5	12	5	8	Ī
8 FT 18	3 20	12	10	6	7	6	7	57.5	38.0	38.0	42.0	7	15	65.0	74.0	7	15	45.0	48.0	6	6	6	8	51.3	136	148	160	7	7	55.0	66.0	5	12	5	7.5	i
20 FT 19	3 21	12	10	6	6	6	6.5	56.6	39.0	39.0	43.0	7	14	64.0	74.0	7	14	45.0	48.0	7	8	6	7.5	50.6	137	149	161	7	7	55.0	66.0	5	12	5	7	Ī
2 FT 2	1 22	12	10	6	6	6	6.5	55.9	41.0	41.0	45.0	7	15	64.0	74.0	7	15	45.0	48.0	7	7	6	6.5	50.3	138	150	162	7	7	55.0	66.0	5	12	5	7	Γ
24 FT 22	2 24	13	10	6	6	6	6.5	56.4	42.0	42.0	46.0	7	14	63.0	73.0	7	14	44.0	48.0	7	7	6	7.5	50.4	140	152	164	7	7	55.0	67.0	5	12	5	6.5	
6 FT 2	3 25	14	10	7	7	6	6.5	56.6	43.0	43.0	47.0	7	14	63.0	73.0	7	14	44.0	48.0	7	6.5	6	8	50.4	141	153	165	7	6.5	55.0	67.0	5	12	5	6.5	
28 FT 25	5 27	14	10	7	7	6	6.5	56.4	45.0	45.0	49.0	7	14	62.0	73.0	7	14	43.0	47.0	7	6.5	6	8	50.3	143	155	167	7	6	55.0	67.0	5	12	5	6	ĺ
30 FT 26		14	10	7	7	6	6.5	56.0	46.0	46.0	50.0	7	13	62.0	73.0	7	13	43.0	47.0	7	6	6	7.5	50.0	144	156	168	7	6	55.0	67.0	5	12	5	6	Ĺ
32 FT 2	7 29	14	10	7	6	6	6	55.6	51.0	51.0	51.0	7	12	62.0	72.0	7	12	43.0	46.0	7	6	6	7.5	49.8	145	157	169	8	7.5	61.0	73.0	5	12	5	6	
	31	15	10	7	6	6	6.5	56.3	53.0	53.0	53.0	7	12	61.0	72.0	7	12	41.0	44.0	7	6	6	7.5	50.3	147	159	171	8	7	61.0	73.0	5	12	6	8	Ĺ
36 FT 30			10	7	6	6	6	56.1	54.0	54.0	54.0	7	12	61.0	71.0	7	12	41.0	43.0	8	7.5	6	7.5	50.3	148	160	172	8	7	61.0	73.0	5	12	6	8	
38 FT 3		16	10	8	7.5	6	6	56.9	55.0	55.0	55.0	8	15	69.0	79.0	8	15	49.0	51.0	8	7.5	6	7	50.6	149	161	173	8	6.5	61.0	73.0	_	12	6	8	L
10 FT 32			10	8	7.5	6	6	56.9	56.0	56.0	56.0	8	14	69.0	78.0	8	14	48.0	50.0	8	7	6	7	50.6	150	162	174	8	6.5	61.0	73.0	5	12	6	8	L
12 FT 3:		_	10	8	7	6	6	56.9			57.0	8	14	69.0	78.0	8	14	48.0	49.0	8	7	6	6.5	50.8	151	163	175	8	6.5	61.0	73.0	5	12	6	8	_
14 FT 34	_		10	8	7	6	6	57.6	58.0			8	14	68.0	77.0	8	14	47.0	49.0	8	7	6	6.5		152	164	176	8	6	61.0	73.0	5	12	6	7.5	
6 FT 35	_		10	8	6.5	6	6	56.5	59.0	59.0	59.0	8	13	68.0	77.0	8	13	47.0	48.0	8	7	6	6.5	50.1	153	165	177	8	6	61.0	73.0	5	12	6	7.5	1
18 FT 35			10	8	6.5	6	6	56.5	59.0	59.0	59.0	8	13	68.0	77.0	8	13	47.0	49.0	8	7	6	6	50.1	154	166	178	8	6	61.0	73.0	5	12	6		
O FT 36	:   30	1 17	10	ρТ	6 5	7	175	61 6	1 60 0	160 0	1 60 0	I 8	1 1 3	1 68 O	1 76 O	l g	13	1 47 0	48.0	8	165	6	6	50.3	155	167	179	Я	6	61.0	i 73. n	15	1 12	I 6	7.5	ì



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



# TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. HE[GHT (HT): 7 THRU 12 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

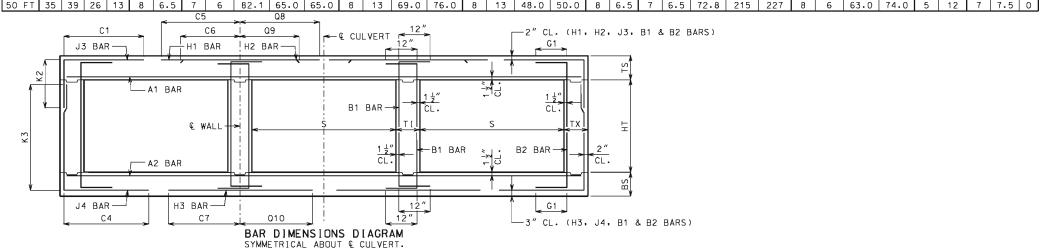
703.87

SHEET NO. 22 OF 27

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) CONCRETE

`											SI	PAN	(S)	= 14	FT			HE I GH	T (HT	「) =	: 13	FT (	OR 14	4 FT											
		MEM										TOP S	SLAB I	BARS										В	MOTTO	SLAB E	BARS					WAL	L BAF	₹S	
DESIGN	Т	HICK	NESS		<b>A</b> 1	BARS			J3	BARS			H1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 [	BARS	B2	BARS	
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1		32 HT=14	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	K HT=13'	3 HT=14′	SIZE	SPA.	C7	010	SIZE	SPA.	SIZE	SPA.	G1
1 FT	14	10	11	11	5	6	5	6.5	71.8	34.0	34.0	5	12	135.5	100.5	5	12	39.0	42.0	5	7	6	6	87.3	162	174	6	6	60.0	62.0	5	12	5	7.5	12
2 FT	15	11	11	11	6	8	5	6.5	71.8	35.0	35.0	6	16	139.5	107.5	6	16	45.0	48.0	5	6.5	6	6.5	83.4	163	175	6	6	59.0	62.0	5	12	5	7.5	12
4 FT	11	11	11	11	6	6.5	6	7	88.0	31.0	35.0	6	13	86.0	92.0	6	13	40.0	40.0	5	6.5	6	6	76.4	163	175	7	6.5	62.0	66.0	5	10.5	5	7.5	12
6 FT	12	12	11	11	6	8	6	7.5	74.5	32.0	36.0	6	13	68.0	75.0	6	13	38.0	39.0	5	6	6	6	71.3	164	176	7	6.5	60.0	65.0	5	12	5	7.5	12
8 FT	12	13	11	11	6	8	6	7	68.5	36.0	36.0	6	12	63.0	67.0	6	12	36.0	37.0	6	8	6	6.5	68.8	165	177	7	6.5	58.0	65.0	5	12	5	7.5	0
10 FT	13	15	11	11	6	7.5	6	6.5	66.0	37.0	37.0	6	12	60.0	65.0	6	12	36.0	37.0	6	7.5	6	6	67.4	167	179	6	6	55.0	63.0	5	12	5	7.5	0
12 FT	14	16	12	11	6	7.5	6	6.5	64.0	38.0	38.0	7	16	61.0	67.0	7	16	38.0	40.0	6	7	6	7	65.3	168	180	7	7	57.0	66.0	5	12	5	7	0
14 FT	16	17	13	11	6	7.5	6	7	69.1	40.0	40.0	6	12	63.0	69.0	6	12	41.0	43.0	6	7	6	6.5	63.6	169	181	7	7	57.0	65.0	5	12	5	6.5	0
16 FT	17	18	13	11	6	7	6	6.5	67.8	41.0	41.0	6	12	62.0	69.0	6	12	41.0	43.0	6	6	6	6.5	62.4	170	182	7	6.5	56.0	66.0	5	12	5	6.5	0
18 FT	18	20	13	11	6	7	6	6	66.6	42.0	42.0	7	15	66.0	74.0	7	15	46.0	48.0	6	6	6	6	61.9	172	184	7	7	56.0	66.0	5	12	5	6.5	0
20 FT	19	21	14	11	6	6.5	6	6	66.3	43.0	43.0	7	15	65.0	73.0	7	15	45.0	48.0	7	8	6	6.5	61.0	173	185	7	7	56.0	66.0	5	12	5	6	0
22 FT	21	23	14	11	6	6	7	8	70.6	45.0	45.0	7	15	64.0	73.0	7	15	45.0	48.0	7	7	6	6	60.8	175	187	7	7	56.0	66.0	5	12	5	6	0
24 FT	22	24	15	11	6	6	7	8	70.5	46.0	46.0	7	15	64.0	73.0	7	15	45.0	48.0	7	7	6	6.5	60.3	176	188	7	7	56.0	66.0	5	12	6	8	0
26 FT	23	25	15	11	7	7.5	7	7.5	69.9	47.0	47.0	7	14	64.0	73.0	7	14	45.0	48.0	7	6.5	6	6	59.6	177	189	7	6.5	56.0	67.0	5	12	6	8	0
28 FT	25	27	16	11	7	7	7	7.5	70.3	49.0	49.0	7	14	63.0	72.0	7	14	44.0	47.0	7	6.5	6	6.5	59.9	179	191	7	6	56.0	67.0	5	12	6	8	0
30 FT	26	28	16	11	7	7	7	7	69.8	50.0	50.0	7	13	62.0	72.0	7	13	43.0	46.0	7	6	6	6	59.4	180	192	7	6	56.0	67.0	5	12	6	8	0
32 FT	27	30	17	11	7	6.5	7	7.5	70.1	51.0	51.0	7	13	62.0	72.0	7	13	43.0	46.0	7	6	6	6.5	59.5	182	194	8	7.5	62.0	73.0	5	12	6	7.5	0
34 FT	28	31	17	11	7	6	7	6.5	69.8	52.0	52.0	7	12	62.0	71.0	7	12	43.0	45.0	7	6	6	6.5	59.1	183	195	8	7	62.0	73.0	5	12	6	7.5	0
36 FT	29	32	18	11	7	6	7	7	70.3	53.0	53.0	7	12	62.0	71.0	7	12	42.0	45.0	8	7.5	6	6.5	59.3	184	196	8	7	62.0	73.0	5	12	6	7	0
38 FT	31	33	19	11	8	7.5	7	7.5	71.0	55.0	55.0	8	15	70.0	78.0	8	15	48.0	50.0	8	7.5	6	6.5	59.6	185	197	8	6.5	62.0	73.0	5	12	6	6.5	0
40 FT	31	34	19	11	8	7	7	6.5	70.9	55.0	55.0	8	14	70.0	78.0	8	14	49.0	51.0	8	7	6	6.5	59.5	186	198	8	6.5	62.0	73.0	5	12	6	6.5	0
42 FT	32	35	20	11	8	7	7	7	71.5	56.0	56.0	8	14	69.0	77.0	8	14	49.0	51.0	8	7	6	6	59.8	187	199	8	6.5	62.0	74.0	5	12	6	6.5	0
44 FT	33	36	20	11	8	7	7	6.5	71.5	57.0	57.0	8	14	69.0	77.0	8	14	48.0	50.0	8	7	6	6	59.9	188	200	8	6	62.0	74.0	5	12	6	6.5	0
46 FT	34	37	20	11	8	7	7	7	70.1	58.0	58.0	8	14	69.0	76.0	8	14	47.0	49.0	8	7	6	6	58.5	189	201	8	6	62.0	74.0	5	12	6	6.5	0
48 FT	35	38	21	11	8	6.5	7	7	70.9	59.0	59.0	8	13	68.0	75.0	8	13	47.0	48.0	8	7	6	6	59.0	190	202	8	6	62.0	74.0	5	12	6	6	0
50 FT	36	39	21	11	8	6.5	7	6.5	70.9	60.0	60.0	8	13	68.0	75.0	8	13	47.0	48.0	8	6.5	6	6	59.1	191	203	8	6	62.0	74.0	5	12	6	6	0

											S	PAN	(\$)	= 14	FT			HE I GH	IT (HI	Γ) =	: 15	FT (	OR 10	6 FT											
		MEM										TOP :	SLAB	BARS										Е	воттом	SLAB E	BARS					WAL	L BAF	.RS	
DESIGN	'	THICK	NES:	5	A1	BARS			J.	3 BARS			Н1	BARS			H2	BARS		A2	BARS			J4	BARS			Н3	BARS		B1 [	BARS	B2	2 BARS	
FILL	TS	BS	ТХ	ΤI	SIZE	SPA.	SIZE	SPA.	C1		<2 ′ HT=16′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	K HT=15′	3 HT=16′	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA.	G 1
1 FT	14	11	12	13	5	6	5	6	72.6	34.0	34.0	5	12	136.5	101.5	5	12	38.0	41.0	5	6.5	6	6	103.4	187	199	6	6.5	62.0	63.0	5	11.5	5	7	12
2 FT	15	12	12	13	6	8	6	8	75.6	35.0	39.0	6	16	143.5	108.5	6	16	45.0	48.0	5	6	6	6.5	99.0	188	200	6	6.5	61.0	63.0	5	12	5	7	12
4 FT	12	12	12	13	6	8	6	7.5	75.6	36.0	36.0	6	15	138.5	89.0	6	15	40.0	41.0	5	6	6	6	90.1	188	200	6	6	60.0	63.0	5	12	5	7	12
6 FT	12	13	12	13	6	8	6	7	89.3	36.0	36.0	6	14	69.0	71.0	6	14	38.0	39.0	5	6	6	6	86.4	189	201	6	6	58.0	63.0	5	12	5	6.5	12
8 FT	12	14	13	13	6	8	6	6.5	78.1	36.0	36.0	6	12	64.0	66.0	6	12	37.0	37.0	6	8	6	6	81.9	190	202	6	6	57.0	62.0	5	12	5	6.5	0
10 FT	13	15	13	13	6	8	6	6.5	75.1	37.0	37.0	6	12	61.0	64.0	6	12	37.0	37.0	6	7.5	6	6.5	79.1	191	203	7	7	59.0	65.0	5	12	5	6.5	0
12 FT	14	16	14	13	6	7.5	6	6.5	72.9	38.0	38.0	6	12	59.0	63.0	6	12	36.0	37.0	6	7	6	6.5	75.6	192	204	7	7	58.0	65.0	5	12	5	6	0
14 FT	15	17	15	13	6	7.5	6	6.5	77.6	39.0	39.0	7	16	69.0	73.0	7	16	47.0	48.0	6	7	6	6.5	73.6	193	205	7	7	58.0	65.0	5	12	6	8	0
16 FT	17	19	15	13	6	7.5	6	6	77.6	41.0	41.0	6	12	63.0	68.0	6	12	42.0	44.0	6	6	6	6	73.5	195	207	6	6	55.0	63.0	5	12	6	8	0
18 FT	18	20	15	13	6	7	7	7.5	81.8	42.0	48.0	7	16	67.0	73.0	7	16	46.0	49.0	6	6	7	7	75.6	196	208	7	7	57.0	66.0	5	12	6	8	0
20 FT	19	21	16	13	6	6.5	7	7.5	81.1	43.0	49.0	7	15	66.0	73.0	7	15	46.0	49.0	7	7.5	7	7.5	74.8	197	209	7	7	57.0	66.0	5	12	6	8	0
22 FT	20	23	17	13	6	6	7	7.5	80.8	44.0	50.0	7	15	65.0	73.0	7	15	46.0	49.0	7	7	7	7.5	74.6	199	211	7	7	57.0	66.0	5	12	6	7.5	0
24 FT	22	24	17	13	6	6	7	7	80.8	46.0	52.0	7	15	65.0	73.0	7	15	46.0	49.0	7	7	7	7	74.1	200	212	7	7	57.0	66.0	5	12	6	7.5	0
26 FT	23	25	18	13	7	7.5	7	7	80.5	47.0	53.0	7	15	65.0	72.0	7	15	46.0	49.0	7	6	7	7.5	73.6	201	213	7	6	57.0	67.0	5	12	6	7	0
28 FT	24	27	19	13	7	7.5	7	7	80.5	48.0	54.0	7	14	64.0	72.0	7	14	45.0	48.0	7	6.5	7	8	73.8	203	215	7	6	57.0	67.0	5	12	6	6.5	0
30 FT	25	28	20	13	7	6.5	7	7	80.6	49.0	55.0	7	13	64.0	72.0	7	13	45.0	48.0	7	6	7	8	73.5	204	216	7	6	57.0	67.0	5	12	6	6.5	0
32 FT	27	30	21	13	7	6.5	7	7	81.1	51.0	51.0	7	13	63.0	71.0	7	13	43.0	46.0	7	6	6	6	70.8	206	218	8	7.5	63.0	73.0	5	12	6	6	0
34 FT	28	31	21	13	7	6.5	7	7	80.9	52.0	52.0	7	12	63.0	71.0	7	12	43.0	46.0	7	6	6	6	70.4	207	219	8	7	63.0	73.0	5	12	6	6	0
36 FT	29	32	22	13	7	6	7	7	81.1	59.0	59.0	7	12	63.0	71.0	7	12	43.0	45.0	8	7.5	7	7.5	73.3	208	220	8	7	63.0	73.0	5	12	6	6	0
38 FT	30	33	22	13	7	6	7	6	81.1	60.0	60.0	7	12	63.0	71.0	7	12	42.0	45.0	8	7.5	7	7	73.4	209	221	8	6.5	63.0	74.0	5	12	6	6	0
40 FT	31	34	23	13	8	7.5	7	6.5	81.8	61.0	61.0	8	15	70.0	78.0	8	15	50.0	52.0	8	7	7	7.5	73.5	210	222	8	6.5	63.0	74.0	5	12	7	7.5	0
42 FT	32	35	24	13	8	7.5	7	6.5	82.3	62.0	62.0	8	14	70.0	78.0	8	14	49.0	51.0	8	6.5	7	7	73.8	211	223	8	6.5	63.0	74.0	5	12	7	7.5	0
44 FT	33	36	24	13	8	7	7	6	82.4	63.0	63.0	8	14	70.0	77.0	8	14	49.0	50.0	8	6.5	7	7	73.9	212	224	8	6	63.0	74.0	5	12	7	7.5	0
46 FT	34	38	26	13	8	7	7	6	83.8	64.0	64.0	8	14	70.0	76.0	8	14	48.0	49.0	8	7	7	7	74.6	214	226	8	6.5	63.0	74.0	5	12	7	7.5	0
48 FT	35	38	26	13	8	6.5	7	6.5	82.1	65.0	65.0	8	13	69.0	76.0	8	13	48.0	49.0	8	6.5	7	7	72.6	214	226	8	6	63.0	74.0	5	12	7	8	0
50 FT	35		26	13	Я	6.5	7	6	82.1			В	13	69.0	76.0	В	13	48.0	50.0	8	6.5	7	6.5	72.8	215	227	В	6		74.0	5	12	7	7.5	Λ



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 14 FEET HE[GHT (HT): 13 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

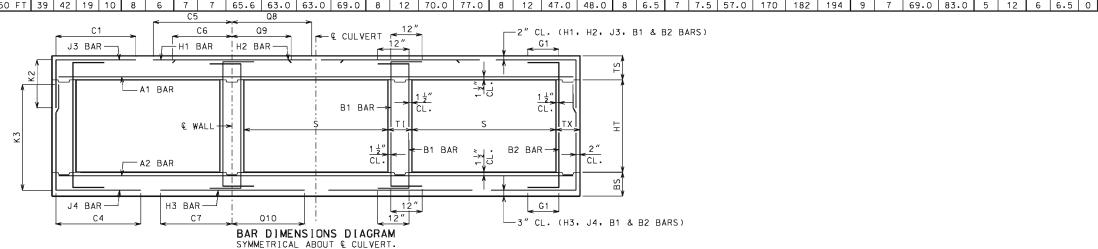
703.87

SHEET NO. 23 OF 27

COMMISSION

											SPAN	(S)	= 1	5 FT			HEI	GHT (	HT) =	8 1	FT OF	₹ 9	FT (	DR 10	FT										
		MEMB	ER								TOP SL	AB B	ARS											Е	воттом	SLAB	BARS						₩AL	L BA	RS
DESIGN		HICKN		A1	BARS			J.	BARS				H1	BARS			Н2	BARS		A2	BARS			J4	BARS				Н3	BARS		В1	BARS	B2	BARS
FILL	TS	BS	тх ті	SIZE	SPA.	SIZE	E SPA.	C1	HT=8'	K2   HT=9 '	HT=1Ω'	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10'	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	15	10	8 8	6	8	5	8	72.9	35.0	35.0	_	6	16	146.5	111.5	6	16	48.0	53.0	5	7	7	6.5	69.0	102	114	126	6	6	61.0	65.0	5	12	5	12 12
2 FT	15		9 8	6	7.5	5	8	73.5	35.0	35.0	35.0	6	16	146.5	111.5	6	16	49.0	53.0	5	6.5	6	7	60.4	103	115	127	6	6	59.0	65.0	5	12	5	12 12
4 FT	12	11	9 8	6	6.5	6	7	60.8	32.0	36.0	36.0	6	12	84.0	109.0	6	12	40.0	43.0	5	6.5	6	6.5	53.9	103	115	127	7	6.5	61.0	68.0	5	11.5	5	12 12
6 FT	12	12	9 8	6	7	6	6.5	53.5	32.0	32.0	36.0	7	16	72.0	86.0	7	16	41.0	43.0	6	8	6	7	49.9	104	116	128	7	6.5	60.0	68.0	5	12	5	12 12
8 FT	13	14	9 8	6	7	6	7	49.5	33.0	33.0	33.0	7	15	67.0	77.0	7	15	39.0	42.0	6	8	5	6.5	43.4	106	118	130	7	7	58.0	69.0	5	12	5	12 0
10 FT	14	15	9 8	6	7	6	7.5	46.6	34.0	34.0	34.0	7	15	64.0	73.0	7	15	39.0	41.0	6	7.5	5	6.5	41.5	107	119	131	7	6.5	58.0	69.0	5	12	5	12 0
12 FT	15	16	9 8	6	6	6	7.5	50.4	35.0	35.0	35.0	7	14	70.0	80.0	7	14	46.0	49.0	6	6	5	6	40.0	108	120	132	7	6.5	57.0	69.0	5	12	5	11.5 0
14 FT	17	18	9 8	6	6.5	6	7.5	48.4	37.0	37.0	37.0	7	15	68.0	79.0	7	15	46.0	49.0	6	6.5	5	6	38.9	110	122	134	7	6.5	57.0	69.0	5	12	5	9.5 0
16 FT	18	19	9 8	6	6.5	6	7.5	47.1	38.0	38.0	42.0	7	14	67.0	79.0	7	14	45.0	49.0	6	6	6	8.5	41.0	111	123	135	7	6.5	57.0	69.0	5	12	5	8.5 0
18 FT	19	21	10 8	6	6	6	7.5	47.8	39.0	39.0	39.0	7	14	66.0	78.0	7	14	45.0	49.0	7	8	5	6.5	37.9	113	125	137	7	6.5	57.0	70.0	5	12	5	9.5 0
20 FT	21	22	10 8	6	6	6	7.5	46.6	41.0	41.0	41.0	7	14	66.0	78.0	7	14	45.0	49.0	7	7.5	5	6	37.5	114	126	138	7	6.5	56.0	70.0	5	12	5	8 0
22 FT	23	24	10 8	7	7.5	6	7.5	46.0	43.0	43.0	43.0	7	14	65.0	77.0	7	14	45.0	49.0	7	7	5	6	37.3	116	128	140	7	6.5	56.0	70.0	5	12	5	8 0
24 FT	24	25	11 8	7	7.5	6	8	46.5	44.0	44.0	44.0	7	13	64.0	77.0	7	13	45.0	49.0	7	6.5	5	6.5	37.5	117	129	141	7	6.5	56.0	70.0	5	12	5	7.5 0
26 FT	25	27	11 8	7	7	6	7.5	46.4	45.0	45.0	45.0	7	13	64.0	77.0	7	13	44.0	48.0	7	6.5	5	6	37.1	119	131	143	7	6	56.0	70.0	5	12	5	7.5 0
28 FT	27	28	11 8	7	6.5	6	7.5	45.8	47.0	47.0	47.0	7	13	64.0	76.0	7	13	44.0	48.0	7	6	5	6	37.1	120	132	144	7	6	56.0	70.0	5	12	5	7.5 0
30 FT	28	30	12 8	7	6.5	6	7.5	46.8	52.0	52.0	52.0	7	12	63.0	76.0	7	12	43.0	47.0	8	7.5	6	8	40.4	122	134	146	8	7.5	62.0	76.0	5	12	5	7 0
32 FT	30	31	12 8	7	6	6	7.5	46.3	54.0	54.0	54.0	7	12	63.0	75.0	7	12	42.0	45.0	8	7.5	6	7.5	40.5	123	135	147	8	7	62.0	76.0	5	12	5	7 0
34 FT	31	32	12 8	8	7.5	6	7.5	46.1	55.0	55.0	55.0	8	15	71.0	83.0	8	15	50.0	53.0	8	6.5	6	7.5	40.3	124	136	148	8	6.5	62.0	76.0	5	12	5	7 0
36 FT	32	34	12 8	8	7.5	6	7	46.1	56.0	56.0	56.0	8	14	71.0	82.0	8	14	49.0	52.0	8	7	6	7	40.3	126	138	150	8	6.5	62.0	76.0	5	12	5	7 0
38 FT	-		13 8	8	7	6	7	47.0	57.0	57.0	57.0	8	14	71.0	82.0	8	14	49.0	51.0	8	7	6	6.5	40.8	127	139	151	8	6.5	62.0	76.0	5	12	5	6.5 0
40 FT	34	36	13 8	8	7	6	6.5	46.9	58.0	58.0	58.0	8	14	70.0	81.0	8	14	49.0	51.0	8	6.5	6	6.5	40.8	128	140	152	8	6	62.0	76.0	5	12	5	6.5 0
42 FT	35	37	13 8	8	6.5	6	6.5	46.9	59.0	59.0	59.0	8	13	70.0	81.0	8	13	48.0	50.0	8	6	6	6.5	40.9	129	141	153	8	6	62.0	76.0	5	12	5	6.5 0
44 FT	36	38	13 8	8	6.5	6	6.5	46.9	60.0	60.0	60.0	8	13	70.0	80.0	8	13	48.0	49.0	8	6	6	6	41.0	130	142	154	8	6	62.0	76.0	5	12	5	6 0
46 FT			13 8	8	6.5	6	6	46.9	61.0	61.0	61.0	8	12	70.0	79.0	8	12	47.0	49.0	8	6	6	6	41.1	131	143	155	8	6	62.0	76.0	5	12	6	8 0
48 FT	38	_	13 8	8	6	6	6	46.1	62.0	62.0	62.0	8	12	69.0	78.0	8	12	46.0	48.0	8	6.5	7	7	43.3	133	145	157	9	7.5	68.0	82.0	5	12	6	8 0
50 FT	39	42	14 8	8	6	6	6	47.1	63.0	63.0	63.0	8	12	69.0	77.0	8	12	46.0	47.0	8	6.5	7	7.5	43.9	134	146	158	9	7	68.0	82.0	5	12	5	6 0

										S	SPAN (	(S)	= 15	FT			HE I G	HT (H	IT) =	11	FT O	R 12	2 FT	OR 1	3 FT											
		MEMBEF			,		·	,	, and the second		TOP SL	AB B	ARS	·	, and the second	_	Ť	, and the second	·		•	_	Ť	- [	BOTTOM	SLAB	BARS		•	, and the second	·		WAL	L BAF	RS	
DESIGN	1	HICKNE	SS	A1 BA	٩RS			J3	3 BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	B2	2 BARS	,
FILL	TS	BS TX	( TI	SIZE S	PA.	SIZE	SPA.	C1	HT=11	K2 'HT=12'	HT=13	SIZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	K3 HT=12'	HT=13	SIZE	SPA.	C7	Q10	SIZE	E SPA.	SIZE	SPA.	G1
1 FT	15	11 9	10	6	8	5	6.5	73.9	35.0	35.0	35.0	6	16	147.5	112.5	6	16	48.0	52.0	5	6.5	6	6	89.3	139	151	163	6	6.5	63.0	67.0	5	12	5	8.5	12
2 FT	15	11 10	10	6	7.5	5	6.5	74.5	35.0	35.0	35.0	6	16	147.5	112.5	6	16	49.0	53.0	5	6.5	6	6	77.1	139	151	163	6	6	61.0	65.0	5	12	5	8	12
4 FT	12	12 10	10	6	7	6	7.5	77.5	32.0	36.0	36.0	6	13	89.0	107.0	6	13	41.0	43.0	5	6	6	6.5	71.3	140	152	164	6	6	60.0	67.0	5	10	5	8	12
6 FT	12	12 10	10	6	7	6	7	67.9	32.0	36.0	36.0	7	16	74.0	83.0	7	16	41.0	43.0	6	8	6	6	65.1	140	152	164	7	6	61.0	68.0	5	12	5	8	12
8 FT	13	14 10	10	6	7.5	6	6.5	63.0	33.0	37.0	37.0	7	16	69.0	75.0	7	16	40.0	42.0	6	7.5	6	6	62.3	142	154	166	7	6.5	60.0	69.0	5	12	5	8	0
10 FT	14	15 10	10	6	7	6	6.5	59.4	34.0	38.0	38.0	7	15	66.0	73.0	7	15	40.0	42.0	6	7	7	6.5	62.4	143	155	167	7	6.5	59.0	69.0	5	12	5	8	0
12 FT	15	17 11	1 10	6	7	6	6.5	63.5	35.0	35.0	39.0	7	14	71.0	79.0	7	14	47.0	49.0	6	7	6	7	57.5	145	157	169	7	7	59.0	69.0	5	12	5	7.5	0
14 FT	17	18 12	10	6	7	6	6.5	62.4	37.0	41.0	41.0	7	15	70.0	78.0	7	15	47.0	49.0	6	6.5	6	7	56.4	146	158	170	7	6.5	58.0	69.0	5	12	5	7	0
16 FT	18	19 12	10	6 6	6.5	6	6.5	61.1	38.0	42.0	42.0	7	14	68.0	78.0	7	14	46.0	49.0	6	6	6	7	55.4	147	159	171	7	6.5	58.0	69.0	5	12	5	7	0
18 FT	19	21 12	10	6	6	6	6	60.4	39.0	43.0	43.0	7	14	68.0	77.0	7	14	46.0	49.0	7	8	6	6	54.6	149	161	173	7	6.5	58.0	70.0	5	12	5	7	0
20 FT	21	22 13	3 10	6	6	6	6	60.3	41.0	45.0	45.0	7	14	67.0	77.0	7	14	46.0	49.0	7	7	6	6.5	54.5	150	162	174	7	6.5	58.0	70.0	5	12	5	6.5	0
22 FT	22	24 13	3 10	6	6	6	6	59.6	42.0	46.0	46.0	7	14	66.0	77.0	7	14	46.0	49.0	7	7	6	6.5	54.0	152	164	176	7	6.5	58.0	70.0	5	12	5	6.5	0
24 FT	24	25 14	1 10	7	7.5	6	6	59.8	44.0	48.0	48.0	7	14	66.0	77.0	7	14	45.0	49.0	7	6.5	6	7	54.1	153	165	177	7	6.5	58.0	70.0	5	12	5	6	0
26 FT	25	27 14	1 10	7	7	6	6	59.5	45.0	49.0	49.0	7	13	65.0	76.0	7	13	45.0	49.0	7	6.5	6	7	53.8	155	167	179	7	6	58.0	70.0	5	12	5	6	0
28 FT	26	28 15	10	7 6	6.5	6	6	59.9	50.0	50.0	50.0	7	13	65.0	76.0	7	13	45.0	49.0	7	6	6	7	53.9	156	168	180	7	6	58.0	70.0	5	12	6	8	0
30 FT	28	30 15	10	7 6	6.5	7	8	64.5	52.0	52.0	52.0	7	12	64.0	76.0	7	12	44.0	47.0	8	7.5	6	7	53.8	158	170	182	8	7.5	64.0	76.0	5	12	6	8	0
32 FT	29	31 15	10	7	6	7	7	64.3	53.0	53.0	53.0	7	12	64.0	75.0	7	12	44.0	47.0	8	7.5	6	6.5	53.5	159	171	183	8	7	64.0	76.0	5	12	6	8	0
34 FT	31	32 16	10	8	7.5	6	6	59.6	55.0	55.0	55.0	8	15	72.0	83.0	8	15	50.0	53.0	8	6.5	6	7	53.8	160	172	184	8	6.5	64.0	76.0	5	12	6	8	0
36 FT	32	34 16	10	8	7.5	7	7	64.5	56.0	56.0	56.0	8	14	72.0	82.0	8	14	50.0	52.0	8	7	6	7	53.8	162	174	186	8	6.5	63.0	77.0	5	12	6	8	0
38 FT	33	35 17	7 10	8	7	7	7.5	65.1	57.0	57.0	57.0	8	14	71.0	82.0	8	14	49.0	52.0	8	7	6	6.5	54.0	163	175	187	8	6.5	63.0	77.0	5	12	6	7.5	0
40 FT	34	36 17	7 10	8	7	7	7	65.1	58.0	58.0	58.0	8	14	71.0	81.0	8	14	49.0	51.0	8	6.5	6	6.5	54.0	164	176	188	8	6	63.0	77.0	5	12	6	7.5	0
42 FT	35	37 18	3 10	8 6	6.5	7	7.5	65.9	59.0	59.0	59.0	8	13	71.0	80.0	8	13	49.0	50.0	8	6	6	6.5	54.4	165	177	189	8	6	64.0	77.0	5	12	6	7	0
44 FT	36	39 18	3 10	8 6	6.5	7	7	66.0	60.0	60.0	60.0	8	13	71.0	80.0	8	13	48.0	50.0	8	6.5	6	6	54.6	167	179	191	8	6	63.0	77.0	5	12	6	7	0
46 FT	37	40 19	10	8 6	6.5	7	7.5	66.8	61.0	61.0	61.0	8	12	70.0	79.0	8	12	48.0	49.0	8	6.5	6	6	55.0	168	180	192	9	7.5	70.0	83.0	5	12	6	6.5	0
48 FT	38	41 19	10	8	6	7	6.5	66.8	62.0	62.0	68.0	8	12	70.0	78.0	8	12	47.0	48.0	8	6.5	7	8	58.1	169	181	193	9	7	70.0	83.0	5	12	6	6.5	0
50 FT	30	42 19	10	Я	6	7	7	65 6	63.0	63.0	69.0	В	12	70.0	77.0	В	12	47.0	48.0	В	6.5	7	7.5	57.0	170	182	194	9	7	69 N	83.0	5	12	6	6.5	Λ



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE. SPACING & DIMENSIONS

SPAN (S): 15 FEET
THIS SHEET HAS BEEN
SIGNED, SCALLED, AND DATED
ELECTRONICALLY.

HE [GHT (HT): 8 THRU 13 FEET

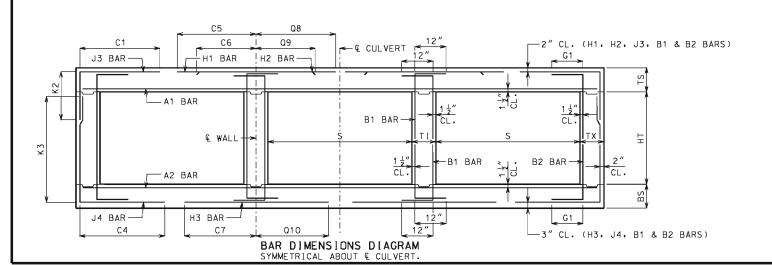
DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 24 OF 27

											SPAN (	S)	= 15	FT		-	HE I G	HT (H	T) =	14	FT N	R 15	FT	OR 1	6 FT									_	$\overline{}$
		MEMBE	· P	T							TOP SL									· · · ·					BOTTOM	SL AB	BARS						WAL	L BAF	₹S
DESIGN	Т	HICKN		A1	BARS			J.	BARS					BARS			H2	BARS		A2	BARS				BARS			Ι	Н3	BARS		В1	BARS		BARS
FILL	TS	BS T	X TI	SIZE	SPA.	SIZE	SPA.	C1	HT=14	K2 HT=15	HT=16′	S I ZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=14'	K3 HT=15'	HT=16	SIZE	SPA.	C7	Q10	SIZE	SPA.	S I ZE	SPA. G1
1 FT	15	11 1	2 13	6	8	6	8	79.3	35.0	35.0	39.0	6	16	152.5	114.5	6	16	48.0	51.0	5	6.5	6	6	99.0	175	187	199	6	6	64.0	65.0	5	11.5	5	7 12
2 FT	15	12 1	2 13	6	8	6	8	79.3	35.0	35.0	39.0	6	16	152.5	114.5	6	16	49.0	52.0	5	6	6	6.5	95.5	176	188	200	6	6	63.0	66.0	5	11.5	5	7 12
4 FT	12	12 1	2 13	6	7	6	7	111.5	36.0	36.0	36.0	6	13	99.0	91.0	6	13	41.0	42.0	5	6	6	6	88.6	176	188	200	7	6.5	65.0	69.0	5	9.5	5	7 12
6 FT	12	13 1	2 13	6	7.5	6	6.5	85.6	36.0	36.0	36.0	6	12	71.0	73.0	6	12	40.0	40.0	6	8	6	6	84.0	177	189	201	7	6.5	64.0	69.0	5	12	5	6.5 12
8 FT	13	14 1	3 13	6	7.5	6	7	77.4	37.0	37.0	37.0	6	12	67.0	70.0	6	12	38.0	39.0	6	7.5	6	6	78.1	178	190	202	7	6.5	62.0	68.0	5	12	5	6.5 0
10 FT	14	16 1	3 13	6	7.5	6	6	75.0	38.0	38.0	38.0	7	15	67.0	71.0	7	15	41.0	42.0	6	7	6	6	77.0	180	192	204	7	7	61.0	69.0	5	12	5	6.5 0
12 FT	15	17 1	4 13	6	7	6	6	78.9	39.0	39.0	39.0	7	15	73.0	78.0	7	15	48.0	50.0	6	7	6	6.5	74.8	181	193	205	7	6.5	60.0	69.0	5	12	5	6 0
14 FT	16	18 1	5 13	6	7	6	6	77.5	40.0	40.0	40.0	7	14	71.0	77.0	7	14	48.0	49.0	6	6.5	6	6.5	73.0	182	194	206	7	6.5	60.0	69.0	5	12	6	8 0
16 FT	18	20 1	5 13	6	7	7	8	81.9	42.0	42.0	42.0	7	15	70.0	77.0	7	15	48.0	50.0	6	6	6	6	72.4	184	196	208	7	7	60.0	69.0	5	12	6	8 0
18 FT	19	21 1	5 13	6	6.5	7	7	80.8	43.0	43.0	49.0	7	14	69.0	77.0	7	14	48.0	50.0	7	8	7	7	74.4	185	197	209	7	6.5	60.0	69.0	5	12	6	8 0
20 FT	20	23 1	6 13	6	6	7	7	80.3	44.0	44.0	50.0	7	14	69.0	76.0	7	14	47.0	50.0	7	7	7	7.5	74.0	187	199	211	7	7	59.0	70.0	5	12	6	8 0
22 FT		24 1	7 13	6	6	7	7.5	80.1	46.0	46.0	52.0	7	14	68.0	76.0	7	14	47.0	50.0	7	7	7	7.5	73.3	188	200	212	7	6.5	59.0	70.0	5	12	6	7.5 0
24 FT	23	25 1	7 13	7	7.5	7	7	79.4	47.0	47.0	53.0	7	14	67.0	76.0	7	14	47.0	50.0	7	6	7	7	72.5	189	201	213	7	6	59.0	70.0	5	12	6	7.5 0
26 FT	25	27 1	8 13	7	7	7	7	79.6	49.0	49.0	55.0	7	14	67.0	76.0	7	14	47.0	50.0	7	6.5	7	7.5	72.5	191	203	215	7	6	59.0	70.0	5	12	6	7 0
28 FT	26		9 13	7	7	7	7	79.6	50.0	50.0	50.0	7	13	66.0	76.0	7	13	46.0	50.0	7	6	6	6	69.5	193	205	217	8	7.5	65.0	76.0	5	12	6	6.5 0
30 FT	27	30 1	9 13	7	6.5	7	6.5	79.3	51.0	51.0	57.0	7	13	66.0	76.0	7	13	46.0	49.0	8	7.5	7	7.5	72.1	194	206	218	8	7.5	65.0	77.0	5	12	6	6.5 0
32 FT	29	31 2	0 13	7	6	7	7	79.5	53.0	53.0	59.0	7	12	65.0	75.0	7	12	44.0	47.0	8	7	7	8	71.9	195	207	219	8	7	65.0	77.0	5	12	6	6.5 0
34 FT	30		21   13	7	6	7	7	79.9	54.0	54.0	54.0	7	12	65.0	75.0	7	12	44.0	47.0	8	7	6	6	69.0	197	209	221	8	6.5	65.0	77.0	5	12	6	6 0
36 FT	31	34 2	22   13	8	7.5	7	6.5	80.1	55.0	61.0	61.0	8	15	73.0	82.0	8	15	52.0	55.0	8	7	7	7.5	71.9	198	210	222	8	6.5	65.0	77.0	5	12	6	6 0
	32		22   13	8	7	7	6	79.8	56.0	62.0	62.0	8	14	73.0	82.0	8	14	52.0	54.0	8	6.5	7	7.5	71.6	199	211	223	8	6.5	65.0	77.0	5	12	6	6 0
40 FT	33	36 2	23 13	8	6.5	7	6.5	80.4	57.0	63.0	63.0	8	13	73.0	82.0	8	13	51.0	54.0	8	6	7	7.5	71.8	200	212	224	8	6	65.0	77.0	5	12	7	7.5 0
42 FT	34		24 13	8	6.5	7	6.5	81.1	58.0	64.0	64.0	8	13	72.0	81.0	8	13	51.0	53.0	8	6.5	7	7	72.4	202	214	226	8	6	65.0	78.0	5	12	7	7.5 0
	35	39 2	25 13	8	6.5	7	6.5	81.9	59.0	65.0	65.0	8	13	72.0	81.0	8	13	50.0	52.0	8	6.5	7	7	72.5	203	215	227	8	6	65.0	78.0	5	12	7	7.5 0
46 FT	36	40 2	26 13	8	6.5	7	6.5	82.5	60.0	66.0	66.0	8	13	72.0	80.0	8	13	50.0	52.0	8	6.5	7	7	72.9	204	216	228	9	7.5	71.0	84.0	5	12	7	8 0
	37		7 13	8	6.5	7	6	83.3	67.0	67.0	67.0	8	12	72.0	79.0	8	12	49.0	51.0	8	6.5	7	7	73.1	205	217	229	9	7	71.0	84.0	5	12	7	8 0
50 FT	38	42 2	27   13	8	6	7	6.5	81.8	68.0	68.0	68.0	8	12	71.0	79.0	8	12	49.0	50.0	8	6	7	7	71.4	206	218	230	9	7	71.0	84.0	5	12	6	6 0



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 15 FEET HE[GHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: DATE PREPARED:

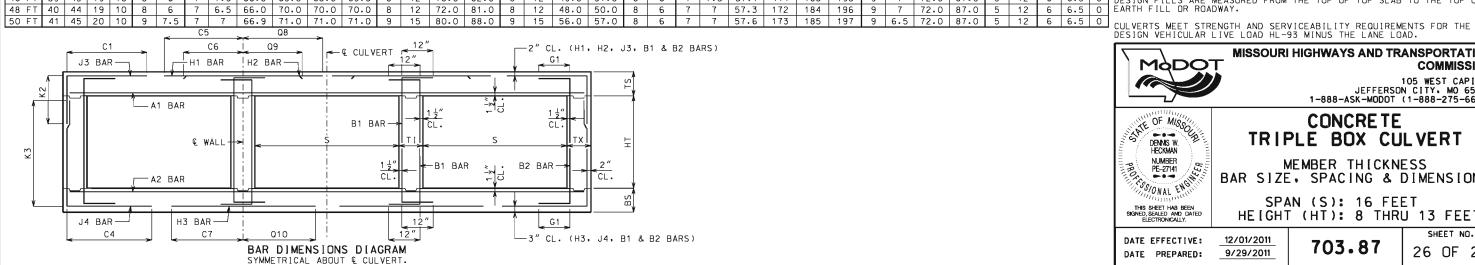
12/01/2011 9/29/2011

703.87

SHEET NO. 25 OF 27

												SPAN	(S)	= 1	6 FT			HE I	GHT (	HT) =	8	FT O	R 9	FT (	DR 10	FT										
		MEMB	ER									TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						₩AL	L BA	RS
DESIGN	Т	HICK	NESS		A1 B	ARS			J.	3 BARS				H.	I BARS			H2	BARS		A2	BARS			J4	BARS				H3	BARS		B1	BARS	B2	2 BARS
FILL	TS	BS	ТХ	TI S	IZE :	SPA.	SIZE	SPA.	C1	HT=8 '	K2 HT=9'	HT=10'	S I ZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=8'	K3 HT=9'	HT=10	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	15	10	9	8	6	7.5	5	8	77.1	35.0	35.0	35.0	6	16	154.5	117.5	6	16	52.0	57.0	5	7	6	6	64.6	102	114	126	7	6.5	66.0	71.0	5	12	5	12 12
2 FT	16	11	9	8	6	7	5	8	77.1	36.0	36.0	36.0	6	14	154.5	117.5	6	14	48.0	53.0	5	6.5	6	6.5	59.3	103	115	127	7	7	65.0	71.0	5	12	5	12 12
4 FT	13	11	9	8	6	6.5	5	6	55.9	33.0	33.0	33.0	6	12	87.0	115.0	6	12	42.0	45.0	6	8	6	6	54.0	103	115	127	7	6	64.0	71.0	5	12	5	12 12
6 FT	13	12	10	8	6	7	5	6	51.4	33.0	33.0	33.0	7	15	75.0	91.0	7	15	42.0	45.0	6	7	6	6.5	51.4	104	116	128	7	6	62.0	70.0	5	12	5	12 12
8 FT	14	14	10	8	6	7	5	6	47.3	34.0	34.0	34.0	7	15	70.0	81.0	7	15	41.0	43.0	6	7.5	5	6.5	44.5	106	118	130	7	6	61.0	71.0	5	12	5	12 0
10 FT	15	16	10	8	6	6.5	6	8	53.6	35.0	35.0	35.0	7	14	75.0	85.0	7	14	48.0	51.0	6	7	5	7	41.6	108	120	132	7	6.5	60.0	72.0	5	12	5	12 0
12 FT	16	17	10	8	6	6.5	6	8	51.3	36.0	36.0	36.0	7	13	73.0	83.0	7	13	47.0	50.0	6	6.5	5	6.5	40.1	109	121	133	7	6	60.0	72.0	5	12	5	12 0
14 FT	18	19	10	8	6	6	6	8	49.0	38.0	38.0	38.0	7	14	71.0	83.0	7	14	47.0	50.0	6	6	5	6.5	38.8	111	123	135	7	6.5	59.0	73.0	5	12	5	12 0
16 FT	19	20	10	8	6	6	6	7.5	47.6	39.0	39.0	39.0	7	13	69.0	82.0	7	13	46.0	50.0	6	6	5	6.5	37.8	112	124	136	7	6	59.0	73.0	5	12	5	11 0
18 FT	20	22	10	8	7	7	6	7.5	46.9	40.0	40.0	40.0	7	13	69.0	81.0	7	13	46.0	50.0	7	7.5	5	6.5	36.8	114	126	138	7	6.5	59.0	73.0	5	12	5	9.5 0
20 FT	22	23	10	8	7	7.5	6	7.5	45.6	42.0	42.0	42.0	7	13	68.0	81.0	7	13	46.0	50.0	7	6.5	5	6	36.5	115	127	139	7	6	59.0	73.0	5	12	5	8 0
22 FT	24	25	10	8	7	7.5	6	7.5	45.0	44.0	44.0	44.0	7	13	67.0	81.0	7	13	46.0	50.0	7	6.5	5	6	36.3	117	129	141	7	6.5	59.0	73.0	5	12	5	8 0
24 FT	25	27	11	8	7	7	6	7.5	45.9	45.0	45.0	45.0	7	12	67.0	80.0	7	12	46.0	50.0	7	6.5	5	6	36.4	119	131	143	7	6	59.0	73.0	5	12	5	7.5 0
26 FT	27	28	11	8	7	6.5	6	7.5	45.1	47.0	47.0	47.0	7	12	66.0	80.0	7	12	45.0	50.0	7	6	5	6	36.4	120	132	144	7	6	59.0	73.0	5	12	5	7.5 0
28 FT	28	30	11	8	7	6	6	7	45.0	52.0	52.0	52.0	7	12	66.0	80.0	7	12	45.0	50.0	8	7.5	6	7	39.0	122	134	146	8	7.5	65.0	79.0	5	12	5	7.5 0
30 FT	30	31	11	8	7	6	6	6.5	44.6	54.0	54.0	54.0	7	12	66.0	79.0	7	12	44.0	48.0	8	7	6	7	39.0	123	135	147	8	7	65.0	79.0	5	12	5	7.5 0
32 FT	31	33	12	8	8	7.5	6	7.5	45.5	55.0	55.0	55.0	8	15	74.0	87.0	8	15	52.0	56.0	8	7	6	7	39.4	125	137	149	8	6.5	65.0	80.0	5	12	5	7 0
34 FT	33	34	12	8	8	7	6	7	45.3	57.0	57.0	57.0	8	14	73.0	86.0	8	14	51.0	54.0	8	6.5	6	7	39.5	126	138	150	8	6.5	65.0	80.0	5	12	5	7 0
36 FT	34	36	12	8	8	7	6	6.5	45.3	58.0	58.0	58.0	8	14	73.0	85.0	8	14	50.0	53.0	8	6.5	6	6.5	39.4	128	140	152	8	6	65.0	80.0	5	12	5	6.5 0
38 FT	35	37	12	8	8	6.5	6	6.5	45.3	59.0	59.0	59.0	8	13	73.0	85.0	8	13	50.0	53.0	8	6.5	6	6.5	39.4	129	141	153	8	6	65.0	80.0	5	12	5	6 0
40 FT	36	39	13	8	8	6	6	6.5	46.1	60.0	60.0	60.0	8	12	73.0	84.0	8	12	50.0	52.0	8	6.5	6	6	39.9	131	143	155	8	6	65.0	80.0	5	12	5	6.5 0
42 FT	38	40	13	8	8	6	6	6	46.0	62.0	62.0	62.0	8	12	72.0	83.0	8	12	48.0	50.0	8	6.5	6	6	40.1	132	144	156	9	7	71.0	86.0	5	12	5	6 0
44 FT	39	41	13	8	8	6	6	6	46.0	63.0	63.0		8	12	72.0	82.0	8	12	48.0	49.0	8	6	7	7	43.3	133	145	157	9	7	71.0	86.0	5	12	6	8 0
46 FT	40	42	13	8	8	6	7	7	51.1	70.0	70.0	70.0	8	12	72.0	82.0	8	12	47.0	48.0	8	6	7	7	43.4	134	146	158	9	7	71.0	86.0	5	12	6	7.5 0
48 FT	41	43	13	8	9	7.5	7	7	51.1	71.0	71.0	71.0	9	15	79.0	89.0	9	15	55.0	56.0	8	6	7	6.5	43.5	135	147	159	9	7	70.0	86.0	5	12	6	7.5 0
50 FT	42	45	13	8	9	7	7	6	51.4	72.0	72.0	72.0	9	15	79.0	88.0	9	15	55.0	56.0	8	6	7	6.5	43.8	137	149	161	9	7	70.0	86.0	5	10.5	6	7 0

										9	SPAN (	(S)	= 16	FT			HEIG	HT (H	IT) =	11	FT OF	₹ 12	PT.	OR 1.	3 FT											
		EMBER									TOP SL	AB B	ARS											В	BOTTOM	SLAB E	BARS						₩AL	LL BA	ARS	
SIGN	THI	I CKNE:	SS	A1	BARS			J3	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		B1	BARS	B <sup>2</sup>	32 BAR	(S
1111	s B	s TX	ΤI	S I ZE	SPA.	SIZE	SPA.	C1	HT=11	K2 'HT=12	′ HT=13′	S I ZE	SPA.	C5	08	SIZE	SPA.	C6	09	SIZE	SPA.	SIZE	SPA.	C4	HT=11'	K3 -tT=12 <b>1</b>	HT=13'	SIZE	SPA.	C7	Q10	SIZE	E SPA.	SIZE	SPA.	. 0
FT 1	5 1	1 9	10	6	7.5	5	6	77.5	35.0			6	16	155.5	118.5	6	16	52.0	57.0	5	6.5	6	6	87.6	139	151	163	6	6	65.0	69.0	15	12	5	8.5	+
FT 1		2 9		6	7	5	6	77.5	36.0		36.0	6	14	155.5		_	14	49.0	54.0	5	6	6	6	79.0	140	152	164	6	6	64.0	69.0	<del>  5</del>	12	5	8.5	-
	-	2 10		6	6.5	6	7	76.3	37.0	37.0		6	12	91.0	115.0	_	12	42.0	45.0	5	6	6	6	69.6	140	152	164	7	6.5	65.0	72.0	5	10.5	5	8	1
	3 1			6	6.5	6	7	67.3	37.0	37.0	37.0	7	15	77.0	88.0	7	15	43.0	45.0	6	7.5	6	6.5	64.3	141	153	165	7	6	64.0	72.0	5	12	5	8	-
FT 1				6	7	6	6.5	61.5	38.0		38.0	7	15	71.0	79.0	7	15	41.0	44.0	6	7	6	6	60.3	142	154	166	7	6	62.0	72.0	5	12	5	8	
FT 1	5 1	6 10	10	6	6.5	6	6	63.9	35.0	39.0		7	14	76.0	85.0	7	14	49.0	51.0	6	6.5	6	6	57.6	144	156	168	7	6.5	61.0	72.0	_	12	5	8	٠
FT 1	6 1	8 11	10	6	6.5	6	6	62.9	36.0	40.0	40.0	7	14	74.0	83.0	7	14	48.0	51.0	6	6.5	6	7	56.4	146	158	170	7	6.5	61.0	73.0	_	12	5	7.5	٠
FT 1	8 1	9 12	10	6	6.5	6	6.5	61.8	38.0	42.0	42.0	7	14	72.0	82.0	7	14	48.0	51.0	6	6	6	7	55.8	147	159	171	7	6.5	61.0	73.0	5	12	5	7	
FT 1	9 2			6	6	6	6	60.8	39.0			7	13	71.0	81.0	7	13	47.0	51.0	7	8	6	7	54.6	149	161	173	7	6.5	60.0	73.0	5	12	5	7	
FT 2	0 2	2 12	10	7	8	7	8	64.6	40.0			7	13	70.0	81.0	7	13	47.0	51.0	7	7.5	6	6	53.8	150	162	174	7	6.5	60.0	73.0	5	12	5	7	
FT 2	2 2			7	8	6	6	59.6	42.0	46.0	46.0	7	13	69.0	81.0	7	13	47.0	51.0	7	7	6	7	53.6	152	164	176	7	6.5	60.0	73.0	5	12	5	6.5	
FT 2	3 2	5 14	10	7	7	6	6	59.8	43.0	47.0	47.0	7	12	69.0	80.0	7	12	47.0	50.0	7	6.5	6	7	53.5	153	165	177	7	6.5	60.0	73.0	5	12	5	6.5	;
FT 2	5 2	7 14	10	7	7	6	6	59.1	45.0	49.0	49.0	7	13	68.0	80.0	7	13	46.0	50.0	7	6.5	6	7	53.3	155	167	179	7	6	60.0	74.0	5	12	5	6	
FT 2	7 2	9 14	10	7	6.5	6	6	58.6	51.0	51.0	51.0	7	13	67.0	80.0	7	13	46.0	50.0	7	6	6	7	53.0	157	169	181	8	7.5	66.0	80.0	5	12	5	6	
FT 2	8 3	0 15	10	7	6.5	6	6	59.1	52.0	52.0	52.0	7	12	67.0	79.0	7	12	46.0	50.0	8	7.5	6	7	53.1	158	170	182	8	7.5	66.0	80.0	5	12	6	8	
FT 3	0 3	2 15	10	7	6	6	6	58.8	54.0	54.0	54.0	7	12	67.0	79.0	7	12	45.0	48.0	8	7	6	7	53.0	160	172	184	8	7	66.0	80.0	5	12	6	8	
FT 3	1 3	3 15	10	8	7.5	7	7	63.4	55.0	55.0	55.0	8	15	74.0	87.0	8	15	53.0	56.0	8	7	6	7	52.8	161	173	185	8	6.5	66.0	80.0	5	12	6	8	
FT 3	2 3	4 16	10	8	7	7	7.5	63.9	56.0	56.0	56.0	8	14	74.0	86.0	8	14	52.0	56.0	8	6	6	7	52.9	162	174	186	8	6	66.0	80.0	5	12	6	8	
FT 3	4 3	6 16	10	8	7	7	7.5	63.8	58.0	58.0	58.0	8	14	74.0	85.0	8	14	51.0	54.0	8	6.5	6	6.5	52.9	164	176	188	8	6	66.0	80.0	5	12	6	8	
FT 3	5 3	7 17	10	8	6.5	7	7.5	64.4	59.0	59.0	59.0	8	13	74.0	85.0	8	13	51.0	53.0	8	6	6	6.5	53.1	165	177	189	8	6	66.0	80.0	5	12	6	7.5	
FT 3	6 3	9 17	10	8	6.5	7	7	64.4	60.0	60.0	60.0	8	13	73.0	84.0	8	13	50.0	53.0	8	6.5	6	6	53.1	167	179	191	8	6	66.0	80.0	5	12	6	7.5	ī
FT 3	7 4	0 17	10	8	6	7	6.5	64.3	61.0	61.0	61.0	8	12	73.0	84.0	8	12	50.0	52.0	8	6	6	6	53.1	168	180	192	9	7	72.0	86.0	5	12	6	7.5	
FT 3	8 4	11 18	10	8	6	7	7	65.0	62.0	62.0	68.0	8	12	73.0	83.0	8	12	49.0	51.0	8	6	7	8	56.6	169	181	193	9	7	72.0	86.0	5	12	6	7	
FT 3	9 4	3 19	10	8	6	7	7.5	66.0	63.0	63.0	69.0	8	12	73.0	82.0	8	12	49.0	51.0	8	6	7	7.5	57.1	171	183	195	9	7	72.0	87.0	5	12	6	6.5	5
FT 4				8	6	7	6.5	66.0	70.0			8	12	72.0	81.0	8	12	48.0	50.0	8	6	7	7	57.3	172	184	196	9	7	72.0	87.0	5	12	6	6.5	
ET Z	1 1	E 20	10	0	7.5	7	7	66 0	71 0	71 0	71 0	a .	1.5	80 0	00 0	0	15	5 C O	57 A	0	6	7	7	57.6	173	105	107	a	6 5	72 0	87 O	T 5	12	G	6 6	_



IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

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#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY• MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 16 FEET HE[GHT (HT): 8 THRU 13 FEET

DATE EFFECTIVE: DATE PREPARED:

12/01/2011 9/29/2011

703.87

SHEET NO. 26 OF 27

										9	SPAN (	S)	= 16	FT		ŀ	IE I G	HT (H	T) =	14	FT OF	₹ 15	5 FT	OR 1	6 FT									_	
		MEMBE	R								TOP SL	AB B	ARS											Е	BOTTOM	SLAB	BARS						WAL	L BA	RS
DESIGN	Т	HICKN	ESS	A1	BARS			Jā	BARS				H1	BARS			H2	BARS		A2	BARS			J4	BARS				Н3	BARS		В1	BARS	B2	2 BARS
FILL	TS	BS 1	X TI	SIZE	SPA.	SIZE	SPA.	C1	HT=14	K2 'HT=15	HT=16′	SIZE	SPA.	C5	Q8	SIZE	SPA.	C6	Q9	SIZE	SPA.	SIZE	SPA.	C4	HT=14'	K3 HT=15	HT=16	SIZE	SPA.	C7	Q10	SIZE	SPA.	SIZE	SPA. G1
1 FT	15	11 1	2 13	6	7.5	6	8	82.9	35.0	35.0	39.0	6	16	160.5	120.5	6	16	51.0	55.0	5	6.5	6	6	97.5	175	187	199	7	7	70.0	71.0	5	10.5	5	7 12
2 FT	16	12 1	2 13	6	7.5	6	8	82.9	36.0	36.0	40.0	6	15	160.5	120.5	6	15	49.0	52.0	5	6	6	6	93.3	176	188	200	7	7	69.0	71.0	5	12	5	7 12
4 FT	12	13 1	3 13	6	6.5	6	6.5	94.8	36.0	36.0	36.0	7	16	92.0	94.0	7	16	46.0	46.0	5	6	6	6.5	87.8	177	189	201	7	7	68.0	73.0	5	8.5	5	6.5 12
6 FT	13	13 1	3 13	6	7	6	7	82.5	37.0	37.0	37.0	7	16	77.0	81.0	7	16	44.0	45.0	6	7.5	6	6	79.3	177	189	201	7	6	66.0	71.0	5	12	5	6.5 12
8 FT	14	15 1	3 13	6	7	6	6.5	77.9	38.0	38.0	38.0	7	15	73.0	77.0	7	15	43.0	44.0	6	7.5	6	6.5	77.8	179	191	203	7	6.5	64.0	72.0	5	12	5	6.5 0
10 FT	15	16 1	3 13	6	7	6	6	80.9	39.0	39.0	39.0	7	15	78.0	83.0	7	15	50.0	51.0	6	6.5	6	6	75.3	180	192	204	7	6	63.0	72.0	5	12	5	6.5 0
12 FT	16	18 1	4 13	6	6.5	6	6	78.5	40.0	40.0	40.0	7	14	76.0	82.0	7	14	49.0	51.0	6	6.5	6	6	73.8	182	194	206	7	6.5	63.0	72.0	5	12	5	6 0
14 FT	17	19 1	4 13	6	6	7	7.5	81.6	41.0	41.0	47.0	7	13	74.0	81.0	7	13	49.0	51.0	6	6	7	7.5	75.0	183	195	207	7	6.5	62.0	72.0	5	12	5	6 0
16 FT	19	21 1	5 13	6	6.5	7	7.5	80.9	43.0	43.0	49.0	7	14	73.0	81.0	7	14	49.0	51.0	7	8	7	7.5	74.0	185	197	209	7	6.5	62.0	73.0	5	12	6	8 0
18 FT	20	22 1	6 13	6	6	7	7.5	80.0	44.0	44.0	50.0	7	13	72.0	80.0	7	13	49.0	51.0	7	7.5	7	7.5	72.9	186	198	210	7	6.5	62.0	73.0	5	12	6	8 0
20 FT	22	24 1	6 13	6	6	7	7	79.1	46.0	46.0	52.0	7	13	71.0	80.0	7	13	48.0	51.0	7	7	7	7.5	72.3	188	200	212	7	6.5	62.0	73.0	5	12	6	8 0
22 FT	23	25 1	7   13	7	7.5	7	7	78.8	47.0	47.0	53.0	7	13	70.0	80.0	7	13	48.0	51.0	7	6	7	8	71.5	189	201	213	7	6	62.0	73.0	5	12	6	7.5 0
24 FT	25	27 1	7   13	7	7	7	7	78.1	49.0	49.0	55.0	7	13	70.0	80.0	7	13	48.0	51.0	7	6.5	7	7	71.3	191	203	215	7	6	61.0	73.0	5	12	6	7.5 0
26 FT	26	29 1	8 13	7	7	7	7	78.1	50.0	50.0	56.0	7	12	69.0	79.0	7	12	48.0	51.0	7	6	7	8	71.0	193	205	217	8	7.5	67.0	80.0	5	12	6	7 0
28 FT	28	30 1	9 13	7	6.5	7	7	78.3	52.0	52.0	52.0	7	12	68.0	79.0	7	12	47.0	51.0	8	7.5	9	6	67.8	194	206	218	8	7.5	67.0	80.0	5	12	6	6.5 0
30 FT	29	32 1	9 13	7	6	7	6.5	77.9	53.0	53.0	59.0	7	12	68.0	79.0	7	12	47.0	51.0	8	7	7	7.5	70.5	196	208	220	8	7	67.0	80.0	5	12	6	6.5 0
32 FT	31	33 2	0 13	8	7.5	7	6.5	78.1	55.0	55.0	61.0	8	15	76.0	87.0	8	15	53.0	57.0	8	7	7	8	70.4	197	209	221	8	6.5	67.0	80.0	5	12	6	6.5 0
34 FT	32	34 2	0 13	8	7.5	7	6	77.6	56.0	56.0	62.0	8	14	75.0	86.0	8	14	53.0	56.0	8	6	7	7	70.0	198	210	222	8	6	67.0	80.0	5	12	6	6.5 0
36 FT	33	36 2	2 13	8	7	7	6.5	78.8	57.0	63.0	63.0	8	14	75.0	86.0	8	14	53.0	56.0	8	6.5	7	7.5	70.3	200	212	224	8	6	67.0	81.0	5	12	6	6 0
38 FT	34	37 2	3 13	8	6.5	7	6.5	79.1	58.0	64.0	64.0	8	13	75.0	85.0	8	13	53.0	56.0	8	6	7	7.5	70.3	201	213	225	8	6	67.0	81.0	5	12	6	6 0
40 FT	36	39 2	3 13	8	6.5	7	6.5	79.0	60.0	66.0	66.0	8	13	75.0	85.0	8	13	51.0	54.0	8	6.5	7	7.5	70.3	203	215	227	8	6	67.0	81.0	5	12	7	7.5 0
42 FT	37	40 2	3 13	8	6.5	7	6	78.9	61.0	67.0	67.0	8	12	74.0	84.0	8	12	51.0	53.0	8	6	7	7	70.3	204	216	228	9	7	73.0	87.0	5	12	7	7.5 0
44 FT	38	42 2	4 13	8	6	7	6	79.8	68.0	68.0	68.0	8	12	74.0	83.0	8	12	50.0	52.0	8	6	7	7	70.8	206	218	230	9	7	73.0	87.0	5	12	7	7.5 0
46 FT	39	43 2	6 13	8	6	7	6.5	81.4	69.0	69.0	69.0	8	12	74.0	83.0	8	12	50.0	52.0	8	6	7	7	71.3	207	219	231	9	7	73.0	87.0	5	12	7	7.5 0
48 FT	40	44 2	7 13	8	6	7	6	82.1	70.0	70.0	70.0	8	12	74.0	82.0	8	12	49.0	51.0	8	6	7	7	71.6	208	220	232	9	7	73.0	88.0	5	12	7	8 0
50 FT	41	45 2	8 13	9	7.5	7	6	83.0	71.0	71.0	71.0	9	15	82.0	89.0	9	15	57.0	58.0	8	6	7	7	72.0	209	221	233	9	6.5	73.0	88.0	5	12	7	8 0

#### Ç5 € CULVERT 12" C6 **Q9** -2" CL. (H1, H2, J3, B1 & B2 BARS) G1 J3 BAR — ⊢¦H1 BAR H2 BAR B1 BAR € WALL-1 ½" CL • -B1 BAR B2 BAR-CL. A2 BAR J4 BAR H3 BAR-G1 \_ —3" CL. (H3, J4, B1 & B2 BARS) BAR DIMENSIONS DIAGRAM SYMMETRICAL ABOUT & CULVERT.

#### GENERAL NOTES:

IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## CONCRETE TRIPLE BOX CULVERT

MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS

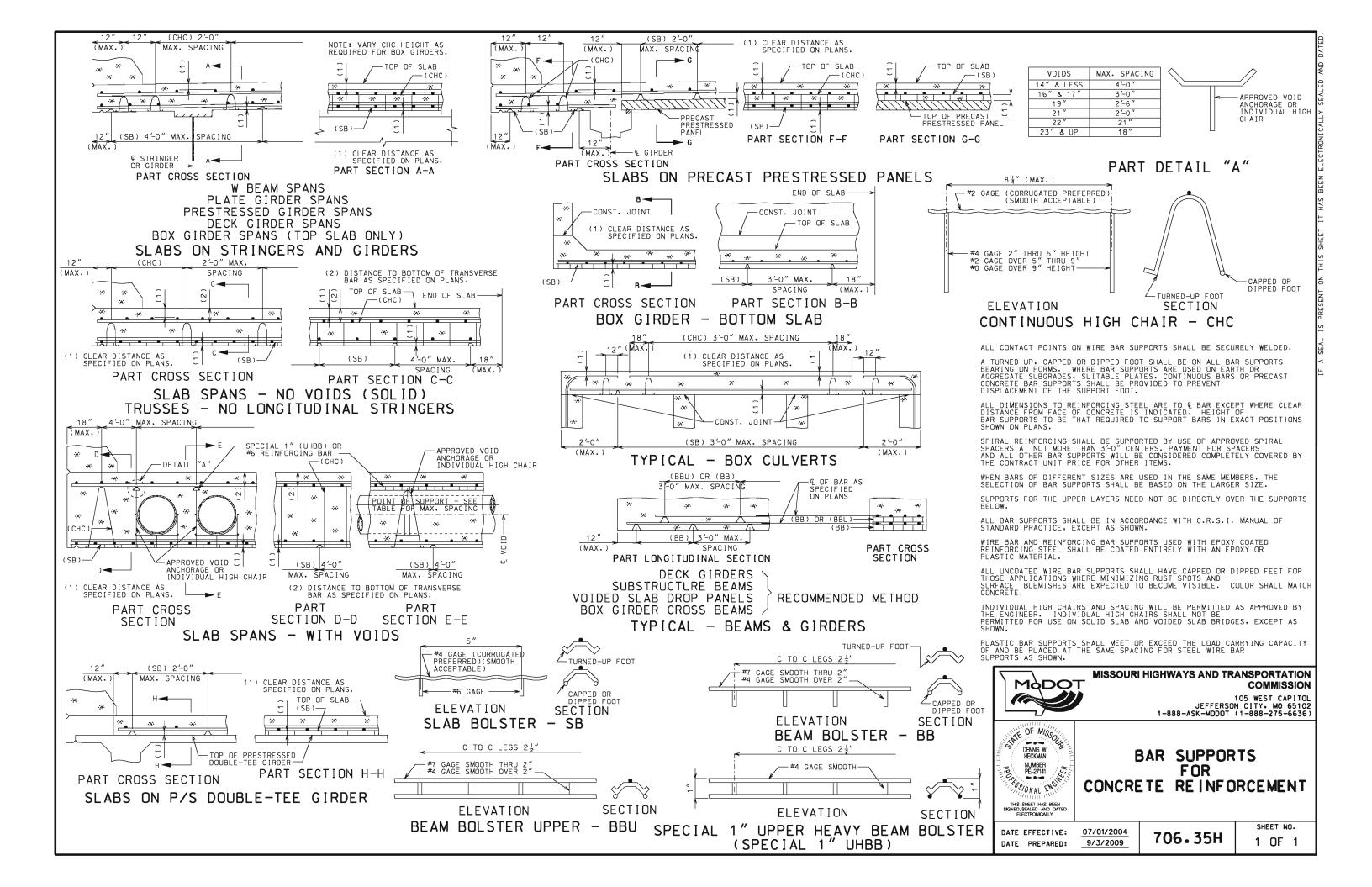
SPAN (S): 16 FEET HE[GHT (HT): 14 THRU 16 FEET

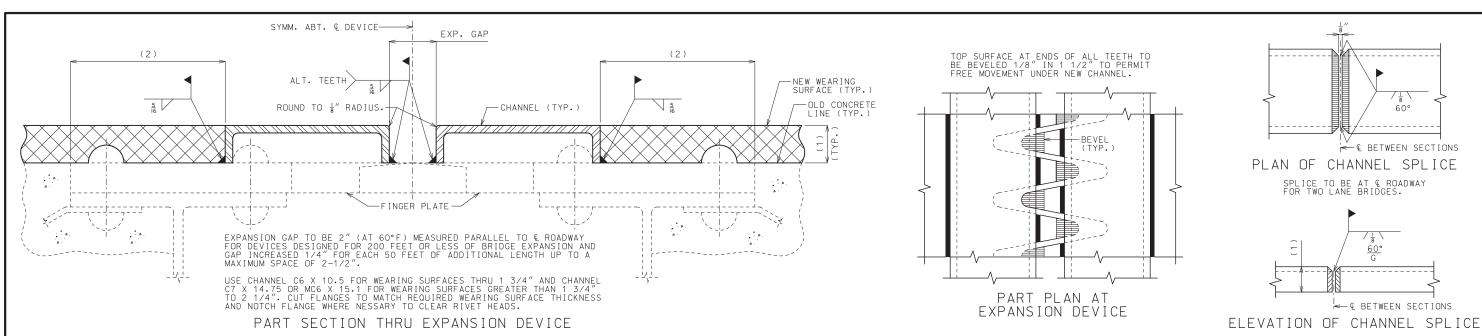
DATE EFFECTIVE: DATE PREPARED:

: 12/01/2011 : 9/29/2011

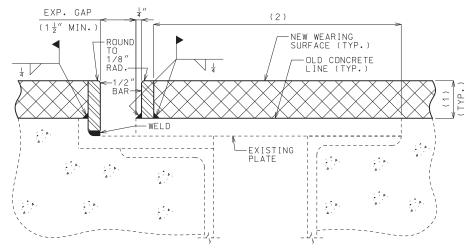
703.87

SHEET NO. 27





TYPE A - FINGER TYPE EXPANSION DEVICES



PART SECTION AT EXPANSION DEVICE

TYPE B - PLATE TYPE EXPANSION DEVICES

-NEW WEARING

SURFACE (TYP.)

## MATCH EXIST. EXP. GAP NEW WEARING ROUND SURFACE (TYP.) OLD CONCRETE RAD ←EXISTING STEEL ARMOR 1-----

(1) WEARING SURFACE THICKNESS

(2) WHEN THIS DIMENSION EXCEEDS 3"
AND A CONCRETE WEARING SURFACE
IS USED, TACK WELD A ONE INCH
BAR CHAIR TO THE PLATE OR ANGLE
FOR EACH 3" OF PLATE OR ANGLE TO

BE COVERED BY WEARING SURFACE.

PART SECTION AT EXPANSION DEVICE

TYPE D - STRIP SEAL TYPE EXPANSION DEVICES

#### **GENERAL NOTES:**

OUTLINE OF OLD WORK IS INDICATED BY LIGHT DASHED LINES. HEAVY LINES INDICATE NEW WORK.

THE EXISTING EXPANSION DEVICE PLATES SHALL BE CHECKED FOR LOOSENESS AND SECURED BEFORE THE NEW BAR DAM IS INSTALLED.

STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM A70

QUALIFICATION OF WELDING OPERATORS WILL BE REQUIRED.

E7016 OR E7018 ELECTRODES SHALL BE USED.

THE STEEL DAMS SHALL EXTEND FULL ROADWAY WIDTH BETWEEN CURBS, BUT SHALL BE INSTALLED IN SECTIONS OF SUCH LENGTHS TO PERMIT AT LEAST ONE WAY TRAFFIC AT ALL TIMES. BEFORE TRAFFIC IS PERMITTED TO CROSS OVER SECTIONS OF DAMS IN PLACE, SUFFICIENT WEARING SUFFACE SHALL BE PLACED ON ROADWAY SLAB ADJACENT TO BOTH SIDES OF EXPANSION DEVICE TO PREVENT ANY DAMAGE TO EITHER THE STEEL DAMS OR TIRES OF VEHICLES.

STEEL DAMS SHALL BE FABRICATED AND INSTALLED TO THE CROWN AND GRADE OF THE ROADWAY.

STEEL CHANNELS OR BARS ON BOTH SIDES OF EXPANSION JOINT, FOR FULL WIDTH OF ROADWAY, WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR STEEL BAR DAM.

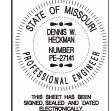
PAINT INSIDE SURFACE OF CHANNEL 5.0 MILS THICKNESS OF INORGANIC ZINC PRIMER.

SHOP DRAWINGS WILL NOT BE REQUIRED FOR STEEL BAR DAMS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## STEEL DAMS

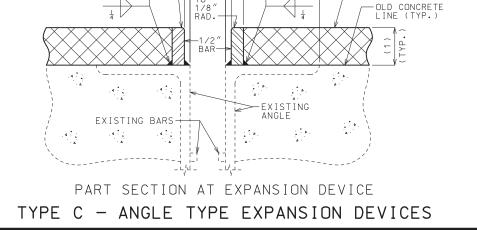
AT EXPANSION DEVICES FOR RESURFACING BRIDGE FLOORS

DATE EFFECTIVE: DATE PREPARED:

10/01/2019

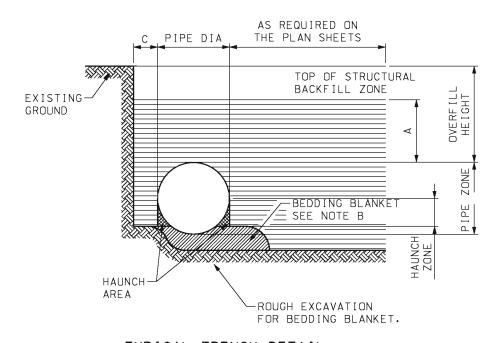
712.40L

SHEET NO. 1 OF 1



MATCH EXIST.

EXP. GAP



## TYPICAL TRENCH DETAIL PIPE INSTALLATION AND BEDDING

#### NOTE:

- A) MINIMUM STRUCTURAL BACKFILL OVER TOP OF PIPE SHALL BE ONE-EIGHTH DIAMETER OR SPAN OF PIPE OR ONE FOOT WHICHEVER IS GREATER.
- B) BEDDING BLANKET OF LOOSE FILL SHALL BE ROUGHLY SHAPED TO FIT BOTTOM OF PIPE. MINIMUM THICKNESS BEFORE PLACING PIPE SHALL BE AS FOLLOWS:

DEPTH OF CORRUGATION	MIN. BEDDING THICKNESS
<u> </u> "	1 "
1 "	2 "
2"	3 "

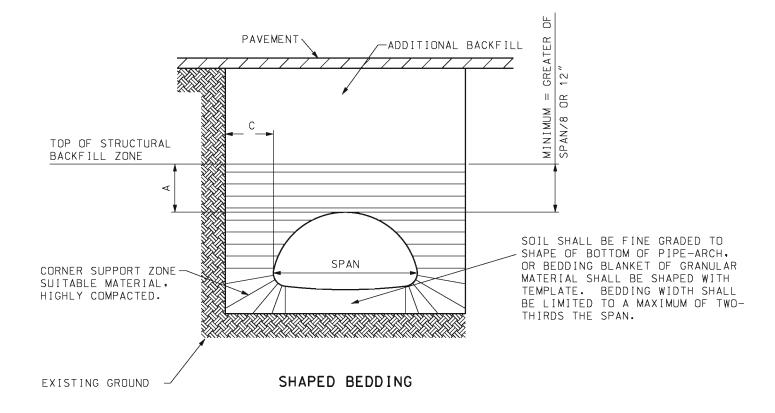
C) TRENCH INSTALLATIONS - 2 FEET MINIMUM EACH SIDE OF CULVERT. THIS RECOMMENDED LIMIT SHOULD BE MODIFIED AS NECESSARY TO ACCOUNT FOR VARIABLES SUCH AS POOR IN-SITU SOILS. EMBANKMENT INSTALLATIONS - ONE DIAMETER OR SPAN EACH SIDE OF CULVERT.

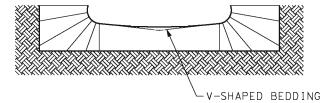


PIF	'E
DIAMETER	SPACE S
UP TO 24"	12"
24" TO 72"	1 PIPE DIA
72" AND OVER	36"

PIPE-ARCHES											
SPAN	SPACE X										
UP TO 36"	12"										
36" TO 108"	1/3 ARCH SPAN										
108" TO 189"	36"										

## MULTIPLE STRUCTURE SPACING

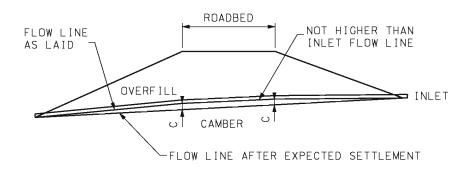




ALTERNATIVE-SHAPED BEDDING

PIPE-ARCH TRENCH DETAIL

### BEDDING AND CORNER ZONE TREATMENT FOR PIPE ARCH STRUCTURES



### TYPICAL CAMBERED FLOW LINE

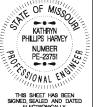
#### NOTE:

ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITIONS AND WILL BE SPECIFIED ON THE DESIGN PLANS.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY MO 65102 1-888-ASK-MODOT (1-888-275-6636)



CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011 DATE PREPARED:

725.00C

SHEET NO. 1 OF 5

	CORRUGATED METALLIC-COATED STEEL CIRCULAR PIPE LOCK SEAM																							
						MAX	IMUM	ALLOW	ABLE	OVER	ILL I	HE I GH	TS (1	)										
SPECIFIED	MINIMU									PECIFIE	D THIC	KNESS (	OF COAT	ED SHE	ET (IN.	)								
DIAMETER OF PIPE	COVER	RPIRAL		0.0	064		0.079				0.109				0.138				0.168					
OF FIFE	CORRUGATED	RIB	А	В	С	D	А	В	С	D	А	В	С	D	А	В	С	D	А	В	С	D		
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.		
12	1	1	219	251	224	144	273	314	280	201	382	440	392	334	492	566	504	484	602	693	617			
15	1	1	175	201	179	115	218	251	224	161	306	352	314	267	394	453	403	387	481	555	493			
18	1	1	146	167	149	96	182	209	187	134	255	293	261	223	328	378	336	323	401	462	411			
21	1	1	125	143	128	82	156	179	160	115	219	251	224	191	281	324	288	277	344	396	352			
24	1	1	109	126	112	72	137	157	140	100	191	220	196	167	246	283	252	242	301	347	308			
30	1	1	87	100	90	57	109	126	112	80	153	176	157	134	197	227	202	194	241	277	247			
36	1	1	73	84	75	48	91	105	93	67	127	147	131	111	164	189	168	161	201	231	206			
42	1	1	62	72	64	41	78	90	80	57	109	126	112	95	141	162	144	138	172	198	176			
48	1	1	55	63	56	36	68	78	70	50	96	110	98	83	123	142	126	121	150	173	154			
54	1	2		56	50	32 <del>*</del>	61	70	62	45	85	98	87	74	109	126	112	108	134	154	137			
60	1	2		50	45			63	56	40	76	88	78	67	98	113	101	97	120	139	123			
66	1	2		46	41			57	51	37 <del>*</del>		80	71	61	89	103	92	88	109	126	112			
72	1	2		42	37			52	47			73	65	56	82	94	84	81	100	116	103			
78	1	2		39	34			48	43			68	60	51		87	78	75	89	107	95			
84	1	2		36	32			45	40			63	56	48*		81	72	69	77	99	88			
90	1	2		33	30			42	37			59	52			76	67	65		92	82			
96	1	2						39	35			55	49			71	63	60 <del>*</del>		87	77			
102	2	3						37	33			52	46			67	59	53 <del>*</del>		82	73			
108	2	3										49	44			63	56			77	69			
114	2	3										46	41			60	53			73	65			
120	2	3										44	39			57	50			69	62			
126	2	3														54	48			66	59			

COPPLICATED	METALLIC-COATED	STEEL	CIPCIII AD	DIDE	DIVETED	SEAM
CURRUGATED	METALLICTODATED	JIEEL	CINCULAR		LIAFIED	JEAM

	MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)																					
	MININ	MUM							S	PECIFI	ED THIC	KNESS	OF COAT	ED SHEI	ET (IN.	)						
SPECIFIED DIAMETER	OVER I			0.0			0.079				0.109				0.138				0.168			
OF PIPE	CORRUGATED	SPIRAL			DOUBLE						<del>                                     </del>		DOUBLE						SINGLE		<u> </u>	
IN.	FT.	RIB FT.	A FT.	B FT.	A FT.	B FT.	A FT.	B FT.	FT.	B FT.	FT.	B FT.	FT.	B FT.	A FT.	B FT.	A FT.	B FT.	FT.	B FT.	A FT.	B FT.
12	1	1	143	1 1 •	185	245	156	1 1 •	255	305	200	1 1 •	382	440	209	1 1 •	419	544	219	1 1 •	438	604
15	1	1	114		148	196	124		204	244	160		306	352	168		335	436	175		351	483
18	1	1	95		123	164	104		170	203	133		255	293	140		279	363	146		292	403
21	1	1	82		105	140	89		146	174	114		219	251	120		239	311	125		251	345
24	1	1	71		92	123	78		127	153	100		191	220	105		209	272	109		219	302
30	1	1	57		74	98	62		102	122	80		153	176	84		168	218	88		175	242
36	1	1	48		62	82	52		85	102	67		127	147	70		140	181	73		146	201
42	1	1	41		53	70	44		73	87	57		109	126	60		120	156	63		125	173
48	1	1	36		46	61	39		64	76	50		96	110	52		105	136	55		110	151
54	1	2				55	35		57	68	44		85	98	47		93	121	49		97	134
60	1	2				49				61	40		76	88	42		84	109	44		88	121
66	1	2				45				55				80	38		76	99	40		80	110
72	1	2				41				51				73	35		70	91	36		73	101
78	1	2				38				47				68				84	34		67	93
84	1	2				35				44				63				78	31		63	86
90	1	2				33				41				59				73				81
96	1	2								38				55				68				76
102	2	3								36				52				64				71
108	2	3												49				60				67
114	2	3												46				57				64
120	2	3												44				54				60
126	2	3																52				58

\* FOR TRENCH INSTALLATION ONLY

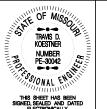
A = 2-2/3" X 1/2" CORRUGATIONS B = 3" X 1" CORRUGATIONS C = 5" X 1" CORRUGATIONS D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 3/22/2022

725.00C

SHEET NO. 2 OF 5

				CORRI	UGAT	ED H	32 A	LUMI	NUM	CIRC	CULAF	RPI	PE L	ОСК	SEAM							
						MAX	IMUM	ALLOW	VABLE	OVERI	FILL	HE I GH	TS (1	)								
SPECIFIED	MINIML									SPECIFI	ED THIC	KNESS	OF COA	TED SHE	ET (IN.	. )						
DIAMETER	COVER	     TCDIDAL		0.	06			0.	075			0.	105			0.	135			0.	164	
OF PIPE	CORRUGATE	RIB	А	В	С	D	А	В	С	D	А	В	С	D	А	В	С	D	А	В	С	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	132	152		71	165	191		97	232	267		156	298	357		221	364	420		
15	1	1	106	122		57	132	153		78	185	213		125	239	286		176	291	336		
18	1	1	88	101		47	110	127		65	155	178		104	199	238		147	243	280		
21	1	1	76	87		41	95	109		56	132	152		89	170	204		126	208	240		
24	1	1	66	76		35	83	96		49	116	133		78	149	178		110	182	210		
30	1	2		61		28	66	76		39	93	107		62	119	143		88	146	168		
36	1	2		51		24 <del>*</del>	55	64		32	77	89		52	99	119		74	121	140		
42	1	2		43				55		28 <del>*</del>	66	76		45	85	102		63	104	120		
48	1	2		38				48			58	67		39	75	89		55	91	105		
54	1	2		34				42			51	59		35	66	79		49	81	93		
60	1	2		30				38				53		31*	55	71		44	68	84		
66	1	2		28				35				48				65		40	56	76		
72	1	3		25				32				44				59		37 <del>*</del>	46	70		
78	1	3						29				41				55				65		
84	1	3										38				51				60		
90	1	3										36				48				56		
96	1	3										33				45				53		
102	2	4														42				49		
108	2	4														39				47		
114	2	4																		42		
120	2	4																		39		
4							1				1											

CORRUGATED	<b>H</b> 32	AL LIMIT NILIM	CIRCIII AR	PIPE	RIVETED	SEAM
CUNNUGATED	ПЈС	ALUMITION	CINCULAN			JLAM

						MAX	I MUM	ALLOW	/ABLE	OVER	FILL	HE I GH	TS (1	)								
	MININ	/ILIM							S	PECIFIE	ED THIC	KNESS	OF COAT	ED SHE	ET (IN.	)						
SPECIFIED DIAMETER	COVE				06				075				105			0.′				0.	164	
OF PIPE	CORRUGATED	SPIRAL	SINGLE		DOUBLE		SINGLE		DOUBLE		SINGLE		DOUBLE		SINGLE		DOUBLE		SINGLE		DOUBLE	
7.1		IVID	A	В	A	В	A	В	A	В	A	B	A	В	A	В	A	В	A	В	A	В
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1		77		120	141	77		154	175	133		269	239	138		282	359	144		291	466
15	'	1	62		96	113	62		123	140	107		215	191	111		226	287	115		232	373
18	1	1	51		80	94	51		103	117	89		179	160	92		188	239	96		194	311
21	1	1	44		68	81	44		88	100	76		154	137	79		161	205	82		166	266
24	1	1	38		60	71	38		77	88	67		135	120	69		141	179	72		145	233
30	1	2				56	31		62	70	53		108	96	55		113	144	57		116	186
36	1	2				47	26		51	58	44		90	80	46		94	120	48		97	155
42	1	2				40				50	38		77	68	40		81	103	41		83	133
48	1	2				35				44	33		67	60	35		71	90	36		73	116
54	1	2				31				39	30		56	53	31		63	80	32		65	104
60	1	2				28				35				48	28		56	72	29		58	93
66	1	2				26				32				44				65	26		53	85
72	1	3				24				29				40				60	24		47	78
78	1	3								27				37				55				72
84	1	3												34				51				67
90	1	3												32				48				62
96	1	3												30				45				58
102	2	4																42				55
108	2	4																40				51
114	2	4																				46
120	2	4																				41
126	2	4																				

\* FOR TRENCH INSTALLATION ONLY

A = 2-2/3" X 1/2" CORRUGATIONS B = 3" X 1" CORRUGATIONS C = 5" X 1" CORRUGATIONS D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 3/22/2022

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	CORRUGATED H34 ALUMINUM CIRCULAR PIPE LOCK SEAM  MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1)																					
						MAX	I MUM I	ALLOW	VABLE	OVER	FILL	HE I GH	TS (1	)								
SPECIFIED	MINIMU								S	PECIFIE	ED THIC	KNESS (	OF COAT	ED SHE	ET (IN.	)						
DIAMETER	COVER	REDIENI		0.	06			0.	075			0.	105			0.	135			0.	164	
OF PIPE	CORRUGATE	RIB	А	В	С	D	А	В	С	D	А	В	С	D	А	В	С	D	А	В	С	D
IN.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.	FT.
12	1	1	159	183		85	199	229		117	278	320		187	358	428		265	437	504		
15	1	1	127	146		68	159	183		93	223	256		150	286	343		212	350	403		
18	1	1	106	122		57	132	153		78	185	213		125	239	286		176	291	336		
21	1	1	91	104		49	113	131		67	159	183		107	205	245		151	250	288		
24	1	1	79	91		43	99	115		58	139	160		94	179	214		132	218	252		
30	1	2		73		34	79	92		47	111	128		75	143	171		106	175	202		
36	1	2		61		28 <del>*</del>	66	76		39	93	107		62	119	143		88	146	168		
42	1	2		52				66		33 <del>*</del>	79	91		54	102	122		76	125	144		
48	1	2		46				57			68	80		47	89	107		66	109	126		
54	1	2		41				51			56	71		42	73	95		59	90	112		
60	1	2		37				46				64		37 <del>*</del>	59	86		53	73	101		
66	1	2		33				42				58				78		48	59	92		
72	1	3		30				38				53				71		42 <del>*</del>	47	84		
78	1	3						35				49				66				78		
84	1	3										46				61				72		
90	1	3										43				57				67		
96	1	3										39				53				62		
102	2	4														48				56		
108	2	4														43				51		
114	2	4																		46		
120	2	4																		41		
	_																					

CORRUGATED	H34	AL LIMIT NILIM	CIRCIII AR	PIPF	RIVETED	SEAM
CUNINUGATED	IIJT	ALUMITION	CINCULAN	1 11 5		SLAM

					· · · · · · · · · · · · · · · · · · ·	MAX	IMUM	ALLOW					ITS (1									
CDECIEIED	MINIM	ИUM							S	PECIFIE	ED THIC		OF COAT	ED SHE	ET (IN.							
SPECIFIED DIAMETER	COVE	ER			06			0.0					105				135				164	
OF PIPE	CORRUGATED	SPIRAL	SINGLE		DOUBLE						<del> </del>		DOUBLE		+		· .		SINGLE			
TAL	FT.	RIB FT.	FT.	B FT.	FT.	B FT.	A FT.	B FT.	A FT.	В	FT.	B FT.	A	B FT.	FT.	B FT.	FT.	B FT.	FT.	B FT.	A FT.	B FT.
IN. 12	1	1	77	FI.	120	141	77	FI.	154	FT. 175	133	FI.	FT. 269	239	138	F 1 •	282	359	144	F I •	291	466
· -	1	1																				373
15	1		62		96	113	62		123	140	107		215	191	111		226	287	115		232	
18	'	1	51		80	94	51		103	117	89		179	160	92		188	239	96		194	311
21	1	1	44		68	81	44		88	100	76		154	137	79		161	205	82		166	266
24	1	1	38		60	71	38		77	88	67		135	120	69		141	179	72		145	233
30	1	2				56	31		62	70	53		108	96	55		113	144	57		116	186
36	1	2				47	26		51	58	44		90	80	46		94	120	48		97	155
42	1	2				40				50	38		77	68	40		81	103	41		83	133
48	1	2				35				44	33		67	60	35		71	90	36		73	116
54	1	2				31				39	30		56	53	31		63	80	32		65	104
60	1	2				28				35				48	28		56	72	29		58	93
66	1	2				26				32				44				65	26		53	85
72	1	3				24				29				40				60	24		47	78
78	1	3								27				37				55				72
84	1	3												34				51				67
90	1	3												32				48				62
96	1	3												30				45				58
102	2	4												- 30				42				55
108	2	4																40				51
114	2	4	-															40				46
120	2	4																				41
126	2	4																				

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#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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## CORRUGATED METAL PIPE INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 3/22/2022

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	(ROUND	AND	PIPE-ARCH)	
MINIMUM	COVER	FOR	CONSTRUCTION	LOADS

DIAMETER OR		INIMUM COVE DICATED AX		
PIPE SPAN	18K LBS 50K LBS.	50K LBS 75K LBS.	75K LBS 110K LBS.	
IN.	FT.	FT.	FT.	FT.
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS. THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.

2-		H REQUIRE /2" CORRE		5
TYPE	SPAN (3)	RISE (3)	GALVANIZ	ED SHEET
1111	(IN.)	(IN.)	THICKNESS (IN.)	GAUGE
B1	17	13	0.064	16
B2	21	15	0.064	16
В3	24	18	0.064	16
В4	28	20	0.064	16
B5	35	24	0.064	16
В6	42	29	0.079	14
В7	49	33	0.109	12
В8	57	38	0.109	12
В9	64	43	0.109	12
B10	71	47	0.138	10
B11	77	52	0.168	8
B12	83	57	0.168	8

ET	TYPE	SPAN (4)	RISE (4)	GALVANIZE 3" X CORRUGA	1 "	GALVANIZE 5" X CORRUGA	1 "	MINIMUM COVER (2)
SE		(IN.)	(IN.)	THICKNESS (IN.)	GAUGE	THICKNESS (IN.)	GAUGE	(IN.)
	B8A	53 (-2.4)	41 (+2.4)	0.079	14	0.109	12	12
	В9А	60 (-2.7)	46 (+2.7)	0.079	14	0.109	12	15
	B10A	66 (-3.0)	51 (+3.0)	0.079	14	0.109	12	15
	B11A	73 (-3.3)	55 (+3.3)	0.079	14	0.109	12	18
	B12A	81 (-3.6)	59 (+3.6)	0.079	14	0.109	12	18
	B13A	87 (-4.4)	63 (+4.4)	0.079	14	0.109	12	18
	B14A	95 (-4.8)	67 (+4.8)	0.079	14	0.109	12	18
	B15A	103 (-5.2)	71 (+5.2)	0.079	14	0.109	12	18
	B16A	112 (-5.6)	75 (+5.6)	0.109	12	0.109	12	21
	B17A	117 (-5.9)	79 (+5.9)	0.109	12	0.109	12	21
	B18A	128 (-6.4)	83 (+6.4)	0.109	12	0.109	12	24
	B19A	137 (-6.9)	87 (+6.9)	0.109	12	0.109	12	24
	B20A	142 (-7.1)	91 (+7.1)	0.138	10	0.138	10	24

PIPE-ARCH REQUIREMENTS

- (2) MINIMUM COVER MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.
- (3) A TOLERANCE OF PLUS OR MINUS ONE INCH OR 2 PERCENT OF EQUIVALENT CIRCULAR DIAMETER, WHICHEVER IS GREATER, WILL BE PERMISSIBLE IN SPAN AND RISE.
- (4) TOLERANCES IN PARENTHESES. NO TOLERANCE IN OPPOSITE DIRECTION.



## MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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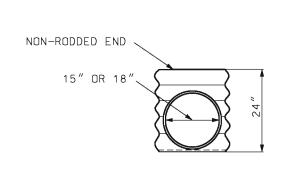


CORRUGATED METAL PIPE INSTALLATION METHODS

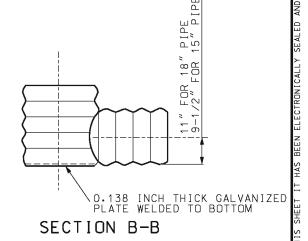
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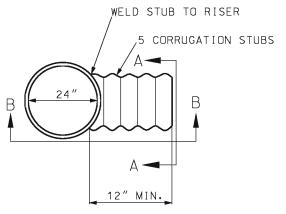
DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 8/24/2015

725.00C

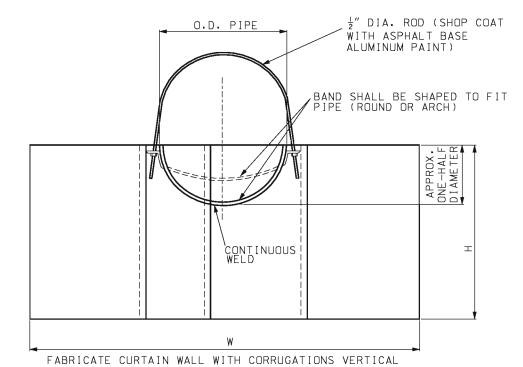




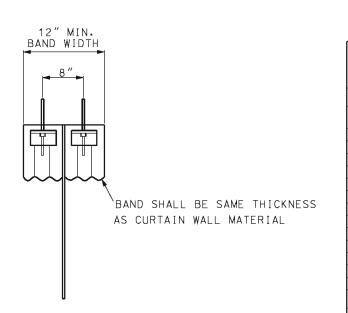




PLAN METAL INLETS



METAL CURTAIN WALL



## TABLE FOR METAL CURTAIN WALL

FOR ROUND OR ELLIPTICAL PIPE

1 011 11	COND ON E	LL 11 1 1 0	- · · · -
DIA. IN. 18 21 24 30 36 42 48 54	GAL V. SHT	W IN. 72 72 72	H IN. 35 35 40
IN.	THICK IN	. IN.	IN.
18	0.064	72	35
21	0.064	72	35
24	0.064	72	40
30	0.064 0.064 0.064 0.064 0.064	84	1 70
36	0.079	84	49
42	0.079 0.079 0.079 0.109 0.109	96	49
48	0.079	96	49
54	0.079	120	49 58-1/2
60	0.109	120	58-1/2
66	0.079 0.079 0.079 0.109 0.109	132	58-1/2 58-1/2 58-1/2 68-1/2 68-1/2
72	0.109	132	68-1/2
78 84	0.138	132	68-1/2
84	0.109 0.138 0.138	84 84 96 96 120 120 132 132 132	68-1/2
		PE ARCH	
B-2	0.004	72	30
B-3	0.064	72	30
B-4	0.079	84	30
B-4 B-5 B-6	0.079	84	30
B-6	0.109	96	35
B-7	0.109	96	35
B-8	0.109	108	35
B-9	0.109	120	35
B-7 B-8 B-9 B-10 B-11	0.064 0.079 0.079 0.109 0.109 0.109 0.109 0.138 0.168	120	30 30 30 35 35 35 35 40
B-11	0.168	125	50
B-12	0.168	72 72 84 84 96 96 108 120 120 125 131	54

GENERAL NOTES:



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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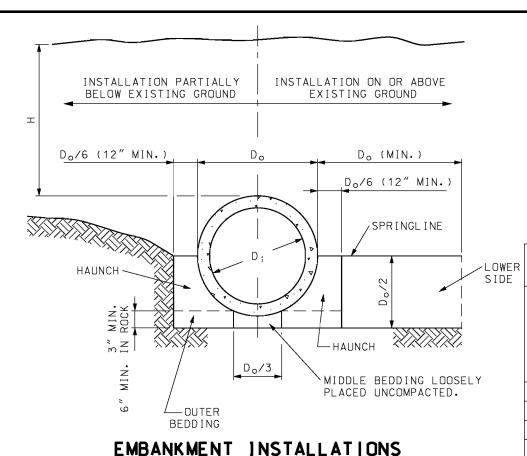
DATE EFFECTIVE: 07/01/2004

8/21/2009

METAL CURTAIN WALL AND METAL INLETS

DATE PREPARED:

725.31C



CONSTRUCTION SEQUENCE

- 1. PLACE BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
- 2. INSTALL PIPE TO GRADE.
- 3. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
- 4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE SPRINGLINE.
- 5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.

	K/X/
INSTALLATION IN INSTALLATION IN  SUITABLE MATERIAL UNSUITABLE MATERIAL  EXCAVATION LINE AS REQUIRE	RED RED
$^{\pm}$ D <sub>o</sub> /6 (12" MIN.) D <sub>o</sub> D <sub>o</sub> (MIN.)	7
D <sub>o</sub> /6 (12" MIN.)	
HAUNCH SPRINGLINE	
N N N N N N N N N N N N N N N N N N N	LOWER
ASS V	SIDE
m = 1	
72 Z Z D <sub>o</sub> /3	
OUTER / MIDDLE BEDDING LOOSE BEDDING PLACED UNCOMPACTED.	LY

## TRENCH INSTALLATION

#### - LEGEND -

D; = NORMAL INSIDE DIAMETER OF PIPE.

 $D_0 = OUTSIDE DIAMETER OF PIPE.$ 

H = FILL COVER HEIGHT OVER PIPE (FEET)

MIN. = MINIMUM>>>>>>> = UNDISTURBED SOIL

GENERAL NOTES:

MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF ½ Do OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".

CLASS I AND CLASS II REINFORCED CONCRETE PIPE SHALL ONLY BE USED FOR SEWERS IN TRENCHES OUTSIDE ROADBED AND STREET LIMITS.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY MO 65102 1-888-ASK-MODOT (1-888-275-6636)



RIGID CULVERT INSTALLATION METHODS REINFORCED CONCRETE

PIPE CULVERTS

DATE EFFECTIVE: 04/01/2015 DATE PREPARED:

726.30J

1 OF 2

SHEET NO.

## MAXIMUM DIAMETER AND MAXIMUM FILL HEIGHT

	CLASS OF PIPE								
INSTALLATION TYPE	CLASS I	CLASS II	CLASS III	CLASS IV	CLASS V				
		MAXIMUM	DIAMETER	(INCHES)					
	108	108	108	84	72				
	N	MAXIMUM FI	LL HEIGHT	IN (FEET	)				
TYPE 1	12	15	21	33	51				
TYPE 2	9	12	17	26	39				
TYPE 3	7	9	13	20	30				
TYPE 4	4	6	9	13	20				

IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS 36 INCHES OR LESS A SPECIAL PIPE DESIGN AND INSTALLATION PROCEDURE SHALL BE REQUIRED. IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS GREATER THAN 36 INCHES A SPECIAL DESIGN PIPE IS NOT ALLOWED.

FLOW LINE ROADBED
NOT HIGHER THAN INLET FLOW LINE
OVERFILL INLET
CAMBER
FLOW LINE AFTER EXPECTED SETTLEMENT

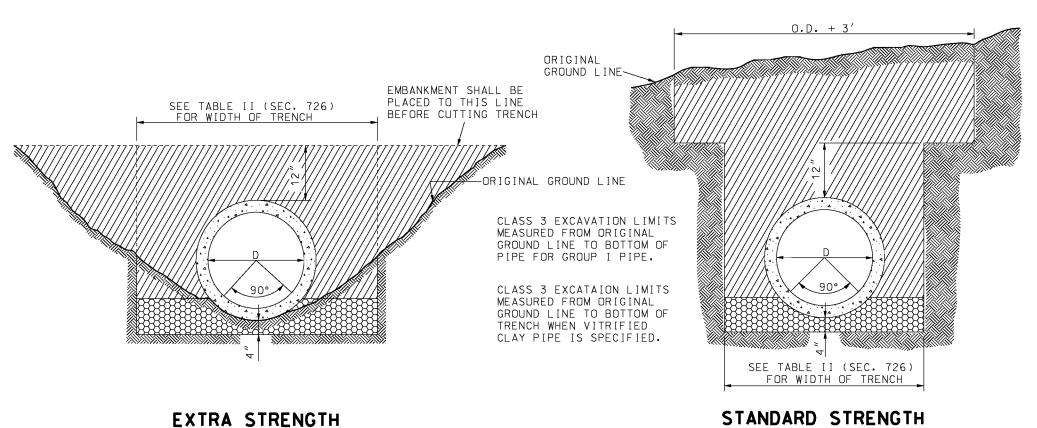
ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND SHALL BE SPECIFIED ON THE DESIGN PLANS.

## TYPICAL CAMBERED FLOW LINE

	BEDDING AND COMPACITON REGULARENESS										
NO I L		COMPACTION REQUIREMENTS (MIN. STANDARD PROCTOR %)									
Ϋ́ΕΑ	BEDDING	HAUNCH	AND OUTER	BEDDING	LOWE	R SIDE BEDI	DING				
INSTALLATION TYPE	THICKNESS	CATEGORY 1 SOIL (A)	CATEGORY 2 SOIL (B)	CATEGORY 3 SOIL (C)	CATEGORY 1 SOIL (A)	CATEGORY 2 SOIL (B)	CATEGORY 3 SOIL (C)				
-	D <sub>o</sub> /24 MINIMUM, NOT	JOIL (A)	3012 (8)	3012 (07	JOIL (A)	3012 (87	3012 (0)				
1	LESS THAN 3". IF ROCK FOUNDATION, USE D <sub>o</sub> /12 MIMIMUM, NOT LESS THAN 6".	95	N/A	N/A	90	95	100				
2	D <sub>o</sub> /24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D <sub>o</sub> /12 MIMIMUM, NOT LESS THAN 6".	90	95	N/A	85	90	95				
3	D <sub>o</sub> /24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D <sub>o</sub> /12 MIMIMUM, NOT LESS THAN 6".	85	90	95	85	90	95				
4	D <sub>o</sub> /24 MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE D <sub>o</sub> /12 MIMIMUM, NOT LESS THAN 6".	NO COMPACTION REQUIRED	NO COMPACTION REQUIRED	85	NO COMPACTION REQUIRED	NO COMPACTION REQUIRED	85				

REDDING AND COMPACTION REQUIREMENTS

- (A) GRAVELLY SAND
- (B) SANDY-SILT
- (C) SILTY CLAY



HEIGHT OF FILL OVER V.C. PIPE CULVERTS											
	STANDARD STRENGTH EXTRA STRENGTH										
NDMINAL PIPE DIAMETER (INCH)	TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET)	MINIMUM FILL HEIGHT (FEET)	MAXIMUM FILL HEIGHT (FEET)	TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET)	MINIMUM FILL HEIGHT (FEET)	MAXIMUM FILL HEIGHT (FEET)					
6	2.0	1.0	9.0								
8	2.0	1.0	7.0	2.5	4.0	12.0					
10	2.5	1.0	7.0	2.5	4.0	12.0					
12	2.7	1.0	6.0	3.0	4.0	13.0					
15	3.5	1.0	6.0	3.0	4.0	17.0					
18	3.5	1.0	6.0	3.5	4.0	17.0					
21	4.0	1.0	6.0	4.0	4.0	17.0					
24	4.0	1.0	8.0	4.0	3.0	19.0					
30	4.5	1.0	10.0	4.5	3.0	19.0					
36	5.0	1.0	11.0	5.0	3.0	19.0					

#### LEGEND

COMPACTED ROADWAY EMBANKMENT

MATTER STATE SACKFILL

LOOSE DRY MATERIAL

COMPACTED SAND



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY: MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# RIGID CULVERT INSTALLATION METHODS

VITRIFIED CLAY PIPE CULVERTS

DATE EFFECTIVE: 04/01/2015 DATE PREPARED:

2/20/2015

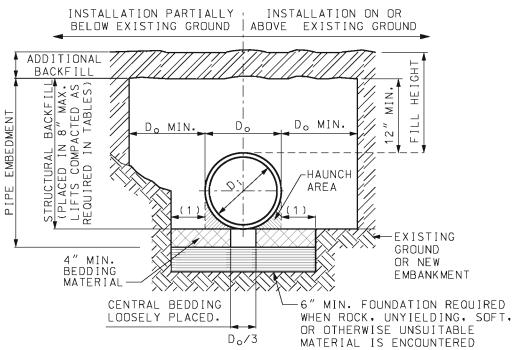
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## TRENCH INSTALLATION

#### **LEGEND**

 $D_{i} = INSIDE DIAMETER OF PIPE.$  $D_{o} = OUTSIDE DIAMETER OF PIPE.$  $(1) = (D_0/4) + 6'' (MIN.)$ 

MULTIPLE PIPE SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF 1 Do OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".



## EMBANKMENT INSTALLATION

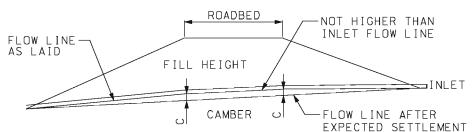
#### CONSTRUCTION SEQUENCE

- 1. PLACE BEDDING MATERIAL TO GRADE.
- 2. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
- 3. INSTALL PIPE TO GRADE.
- 4. COMPLETE STRUCTURAL BACKFILL ACCORDING TO SPECIFICATIONS.

FILL HEIGHT LIMITS																			
CTDUCTUDAL	SPECIFIED POLYETHYLENE		STEEL RE POLYET	INFORCED HYLENE		POLY	/INYL				E WALI OPYLEI		TRIPLE WALL POLYPROPYLENE						
STRUCTURAL BACKFILL	NOMINAL DIA OF PIPE (IN.)	90%	SPD	95%	ACTION SPD	COMPA 90%	SPD	90%	SPD	95%		90%	SPD	95%	SPD	COMPA 90%	SPD	95%	SPD
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.		MIN.	MAX.	MIN.	MAX.
OIL )	12	2'	19'	2'	26'			2'	32'	2'	61'	2'	21'	2'	29'				
3)	15	2'	19'	2'	27'			2'	32'	2'	55′	2'	22'	2'	31′				
A3.	18	2'	17'	2'	25'			2'	31'	2'	60'	2'	19'	2'	27'				
<u> </u>	24	2'	15'	2'	21'	2'	50'	2'	30'	2'	54'	2'	16'	2'	22'				
§ <u>₹</u>	30	2'	17′	2'	24'	2′	50′	2'	31′	2'	52'	2'	11'	2'	15'	2'	17'	2'	23'
GRAVEL TO M145 E A1 &	36	2′	13′	2'	19′	2′	50′	2'	30'	2'	53′					2'	15′	2'	21'
GR ASHTO TYPE #	42	2′	13′	2 ′	19'	2′	50′									2'	19'	2'	27'
\AS TY	48	2′	12′	2'	18′	2′	30′									2'	12'	2'	17'
Α,	60	2′	13′	2'	20'	2′	30′									2'	16′	2'	23'
L	12	2'	17′	2'	23'			2'	32′	2'	55′	2'	18′	2'	24'				
100	15	2'	16′	2'	22'			2'	32'	2'	49'	2'	22'	2'	31′				
AND 5 S( -b)	18	2'	15′	2'	21'			2'	31′	2'	53′	2'	16'	2'	21'				
N 4 -	24	2′	14'	2'	20'	2′	50′	2'	30′	2'	48′	2'	13'	2'	17′				
A-A	30	2'	13′	2'	19'	2′	50′	2'	31'	2'	46'	2'	7′	2'	10'	2'	17′	2'	23′
RS 0 E	36	2′	12′	2′	17′	2′	50′	2'	30'	2'	46'					2'	15′	2'	21'
COURS SHTO TYPE	42	2′	13′	2′	18′	2′	50′									2'	19′	2'	27′
< <	48	2′	12′	2′	17′	2′	30′									2'	12'	2'	17'
₹)	60	2′	13′	2′	20'	2′	30′	==		10000	==	==		===		2'	16′	2'	23′
L	12	3.3'	10'	2'	17'			2.7'	16′	2'	33′	2.8'	111	2'	19'				
SAND OR GRAVEL M145 SOIL A-2-4 -2-5)	15	3.4'	10'	2'	16'			2.7'	16′	2'	33′	2.8'	111	2'	23'				
NE S	18	3.6'	10'	2'	15′			2.7'	15′	2'	32'	3'	11′	2'	16′				
5.43A	24	3.8'	9'	2'	14'	2'	50′	2.7	15′	2'	31′	3.3'	10'	2'	13'				
SA GF M1	30	3.7'	10′	2'	14'	2'	50′	2.8'	15′	2'	31′	3.4'	6′	2'	7'	3'	10'	2'	17'
Υ : ΓΥ 10 I ES A-	36	4.2'	7′	2′	12′	2′	50′	2.8'	14'	2'	31′					3.3'	10'	2'	15′
· 건글달년 🎖	42	4.2'	7′	2′	13′	2′	50 <i>′</i>									3.2'	11'	2'	20'
SILTY SILTY ASHTO TYPES & A-	48	4.5'	6′	2′	12′	2′	30 <i>′</i>									3.1'	9′	2'	13'
( <del>A</del>	60	3.3'	7′	2′	14′	2′	30 <i>′</i>									2'	10'	2'	17'

MINIMUM (	OVER FO	R CONST	RUCTION	LOADS				
NOMINAL MINIMUM COVER (FT) FOR INDICATED AXLE LOA (THOUSANDS OF POUNDS)								
(114.)	18-50	50-75	75-110	110-150				
12-36	2.0	2.5	3.0	3.0				
42-60	3.0	3.0	3.5	4.0				

MINIMUM COVER LIMITS ARE NOT SUFFICIENT FOR SILTY SAND OR SILTY GRAVEL STRUCTURAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY. THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.



ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND WILL BE SPECIFIED ON THE DESIGN PLANS.

## TYPICAL CAMBERED FLOW LINE

#### NOTE:

SPD = STANDARD PROCTOR DENSITY.

FILL HEIGHT MEASURED FROM THE TOP OF PIPE TO SURFACE.

LIMITS ACCOUNT FOR SHORT-TERM TEMPORARY WATER TABLE DEPTHS OF FIVE FEET ABOVE SPRINGLINE. TABLES ARE NOT APPLICABLE FOR LONG-TERM PERMANENT WATER TABLE DEPTHS ABOVE SPRINGLINE.

WHEN PIPES ARE USED AS GROUP A, FILL HEIGHTS ARE LIMITED TO SHADED VALUES.

#### MISSOURI HIGHWAYS AND TRANSPORTATION MODOT COMMISSION

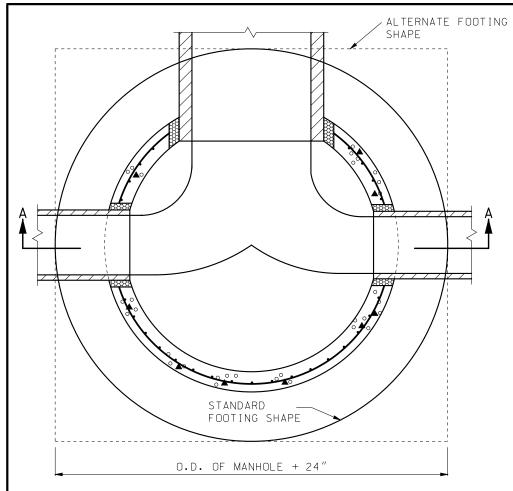
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



THERMOPLASTIC PIPE INSTALLATION **METHODS** 

DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/27/2015

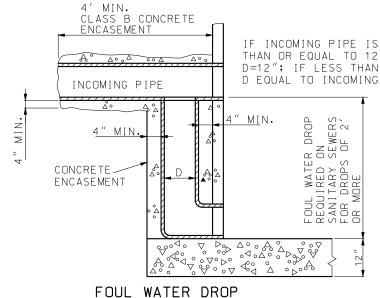
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#### PLAN OF FOOTING

BASE SECTION	DIMENSIONS*
SIZE OF PIPE	MIN. DIA.
24" OR SMALLER	48"
30" - 36"	60"
42" - 48"	72"

\* RISER SECTIONS SHALL NOT BE LESS THAN 42" DIAMETER.



IF INCOMING PIPE IS GREATER
THAN OR EQUAL TO 12", USE
D=12"; IF LESS THAN 12", USE
D EQUAL TO INCOMING PIPE DIA.

STEP INSTALLATION

10" MIN.

INNER FACE OF

MANHOLE WALL

TYPE 4 FRAME AND COVER ADJUSTING RINGS AS REQUIRED BUT NOT TO EXCEED 12". 42" MIN RESULTS CUT-OUT N W DESIGN USE FULL VARIABL EXPANSIVE MORTAR OR CAST SECTION WITH MINIMUM WHERE LESS THAN 6" 1 PIPE STUB IN PLACE A A  $^{\circ}_{\circ}^{\circ}_{\circ}$ DIAMETER O.D. OF MANHOLE + 24" PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.

#### SECTION A-A

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'. STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.

GENERAL NOTES:

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE MANHOLES, IN ACCORDANCE WITH THE CONCRETE MANHOLE STANDARD.

IF THE CONTRACTOR ELECTS TO CAST IN PLACE THE MANHOLES, PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR PRECAST MANHOLES.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH AN ESTABLISHED MANUFACTURING PROCEDURE.

FORMED OR CUT OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

THE TOP OF THE INLET SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

REINFORCEMENT SHALL BE CUT AT PIPE OPENINGS.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE, NOR FOR CUTTING AND BENDING REINFORCING STEEL.

WHERE THE WIDTH OF THE BASE SECTION IS GREATER THAN 42" AN ECCENTRIC TAPER SECTION MAY BE USED TO ALLOW THE USE OF 42" RISER SECTIONS.

THE LOWER TRANSITION SECTION AS SHOWN ON SECTION A-A IS OPTIONAL.

FOUL WATER DROPS ARE REQUIRED WHEN SPECIFIED IN THE PLANS. NO DIRECT PAYMENT WILL BE MADE FOR THE FOUL WATER DROP OR ITS ENCASEMENT.

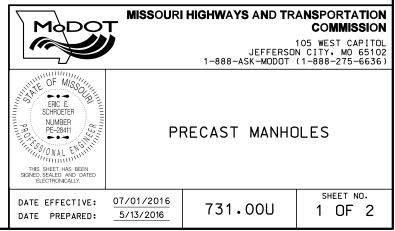
SEE STANDARD PLAN 614.30 FOR MANHOLE FRAMES AND COVERS.

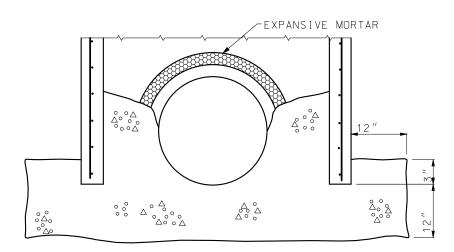
WHERE PIPES DO NOT ENTER OR EXIT RADIALLY, USE NEXT LARGER SIZE MANHOLE. CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL LIMITS 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION ON THE MANHOLE, CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

ALL PIPE CONNECTED WITH A MANHOLE WILL BE MEASURED AND PAID FOR TO THE INSIDE WALL OF THE MANHOLE.

CIRCUMFERENTIAL REINFORCEMENT SIZE AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS TO A MAXIMUM DEPTH OF 20 FEET. OVER 20 FOOT DEPTH CIRCUMFERENTIAL REINFORCEMENT IS INCREASED TO 0.24 SQUARE INCHES STEEL REQUIRED PER LINEAR FOOT, TO A MAXIMUM DEPTH OF 30 FEET.

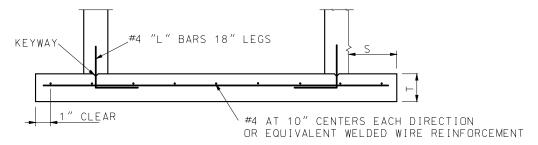
FOR PIPE CONNECTIONS, A RUBBER GASKET IN ACCORDANCE WITH ASTM RUBBER GASKET SPECIFICATIONS C-443 OR C-923 AND CAST INTEGRALLY IN MANHOLE MAY BE USED AS AN ALTERNATE TO EXPANSIVE MORTAR.





ALTERNATE FOOTING

PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.

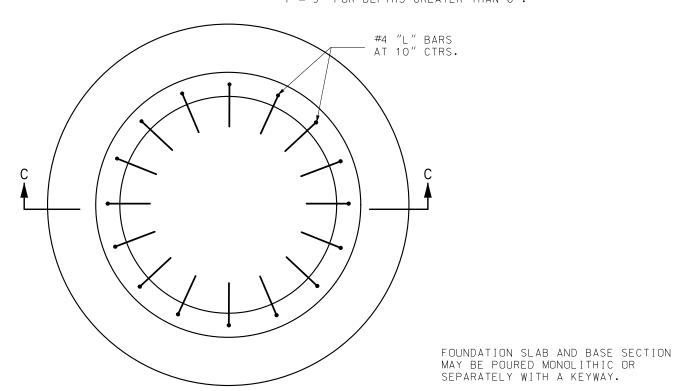


SECTION C-C S = 0 FOR DEPTHS LESS THAN OR EQUAL TO 6': S = 9" FOR DEPTHS GREATER THAN 6'.

> T = 6" FOR DEPTHS OR LESS THAN OR EQUAL TO 6'; T = 9" FOR DEPTHS GREATER THAN 6'.

> > INVERT SHALL BE POURED AFTER

PLACEMENT OF MANHOLE.

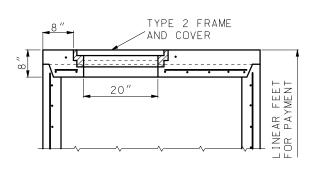


PRECAST FOUNDATION SLAB

TYPE 1A OR 1B FRAME WHEN P=8", F=9", AND COVER \ WHEN P=9" OR 10", F=10". FEET 2 LAYERS OF TAR PAPER INEAR OR PAY

FLAT SLAB MANHOLE TOP (PAVED AREA)

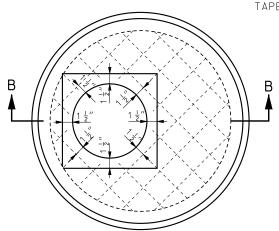
#### SECTION B-B



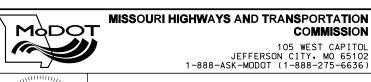
## ALTERNATE SECTION B-B

ALTERNATE FLAT SLAB MANHOLE TOP (UNPAVED AREA) USED WHERE DEPTH OF MANHOLE WILL NOT PERMIT USE OF CONE AND TAPER SECTIONS.





PLAN OF FLAT SLAB MANHOLE TOP





TYPE 4 FRAME

AND COVER >

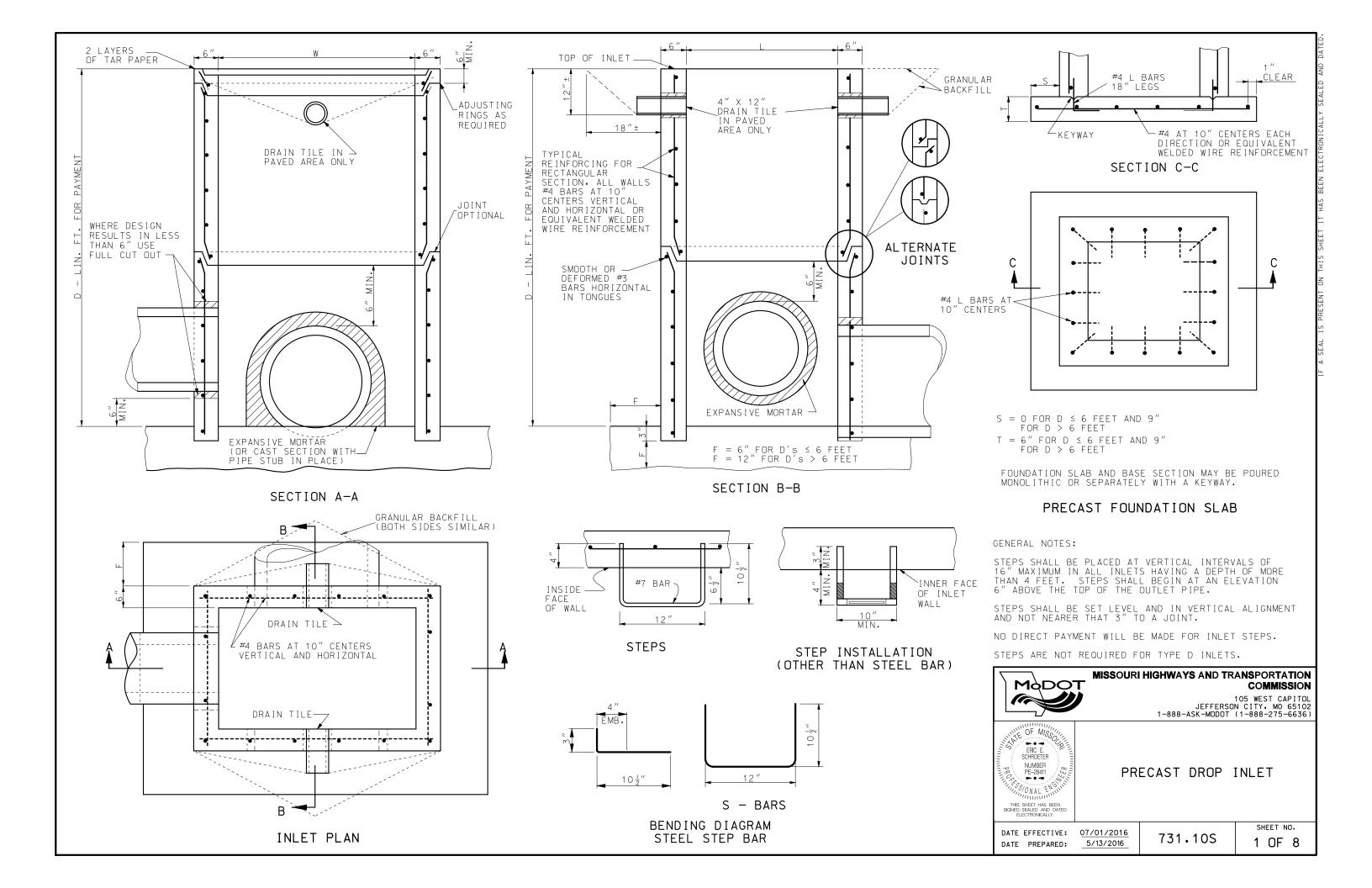
PRECAST MANHOLES

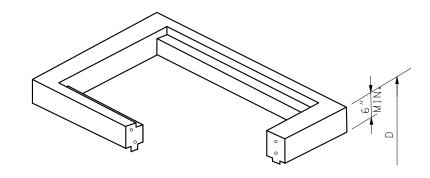
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016

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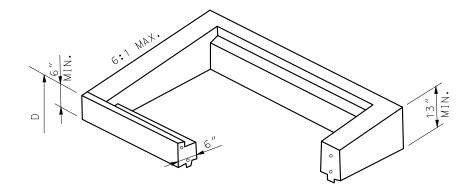
SHEET NO. 2 OF 2

COMMISSION

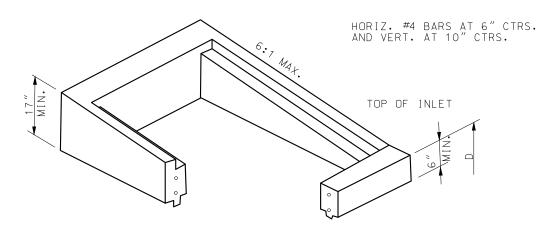




TYPE S-1



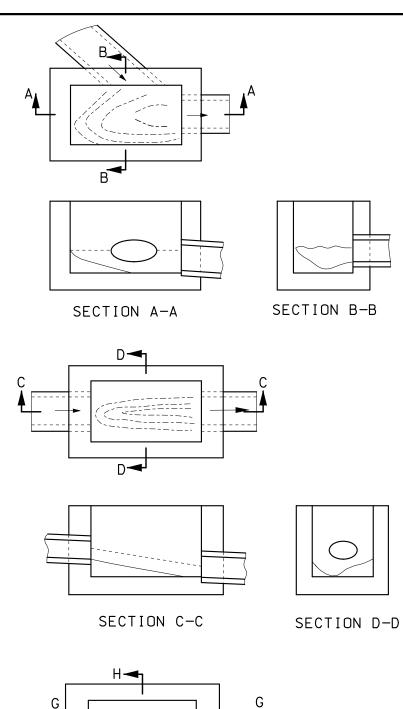
TYPE S-2

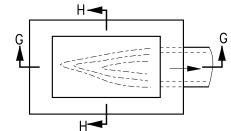


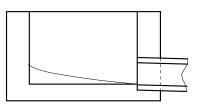
TYPE S-3

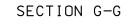
SEE STANDARD PLAN 614.10 FOR GRATES AND BEARING PLATES. TYPICAL LOCATION DETAILS ARE INDICATED ON SHEETS 7 AND 8 OF 8. TOP SECTIONS MAY BE CAST MONOLITHIC WITH BASE SECTION.

	DROP INLET	
WIDTH FT.	LENGTH FT.	TYPE
2	2	A,B,C
4	2	A,D,C
2	2	D
3	2	
3	3	E,S-1
5	2	S-2,S-3
5	3	









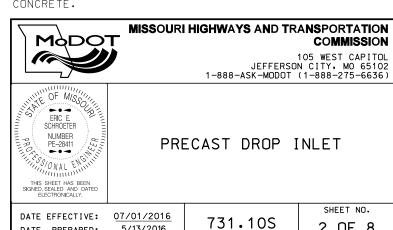
SECTION H-H

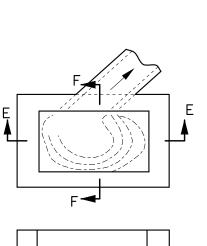
TYPICAL INVERTS



DATE PREPARED: 5/13/2016

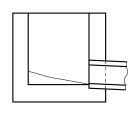
THE CONCRETE FOR INVERTS SHALL BE PLACED AFTER COM-PLETION OF THE DROP INLET BOX. NO DIRECT PAYMENT WILL BE MADE FOR FURNISHING OR PLACING INVERT CONCRETE.





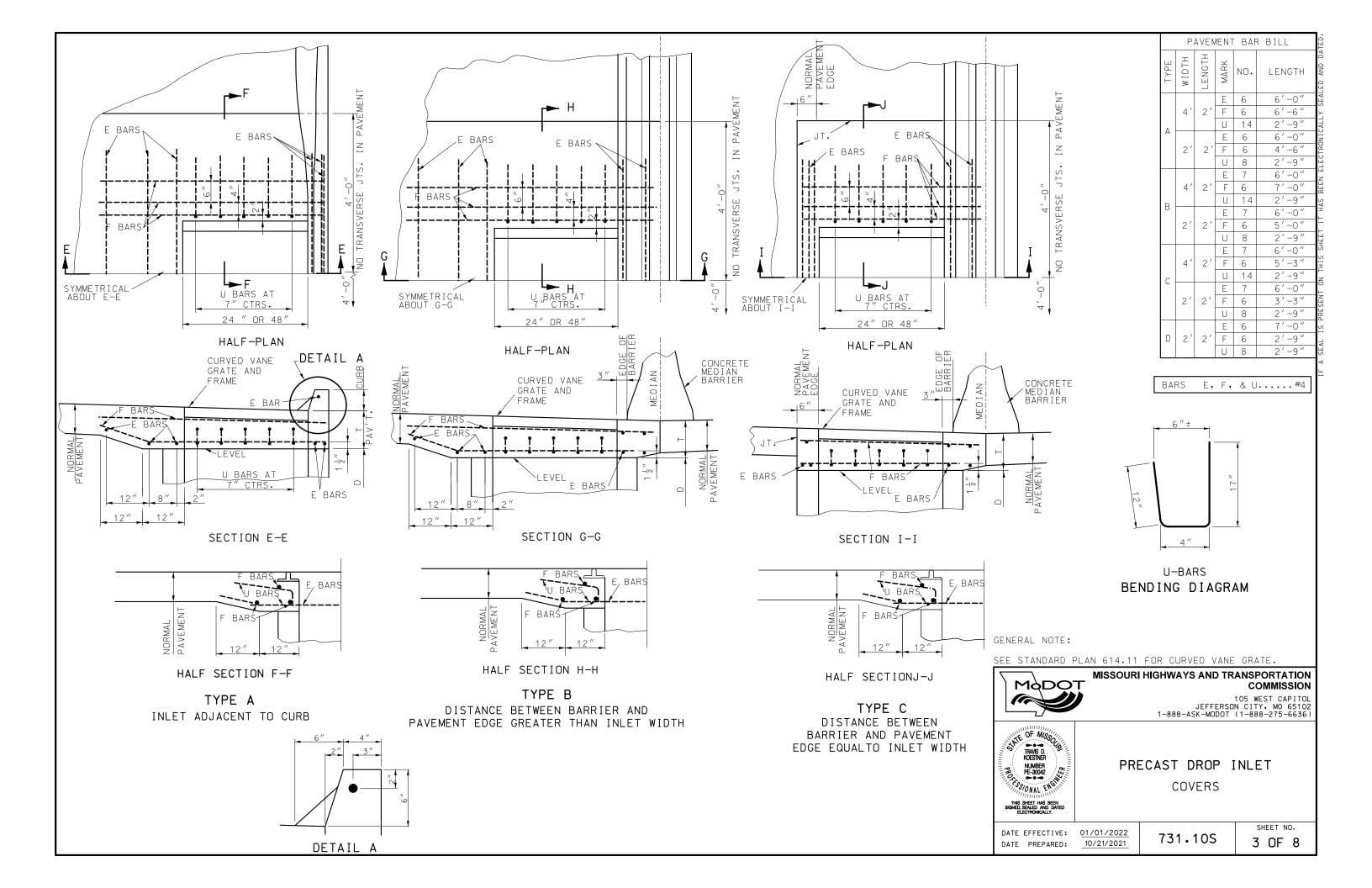


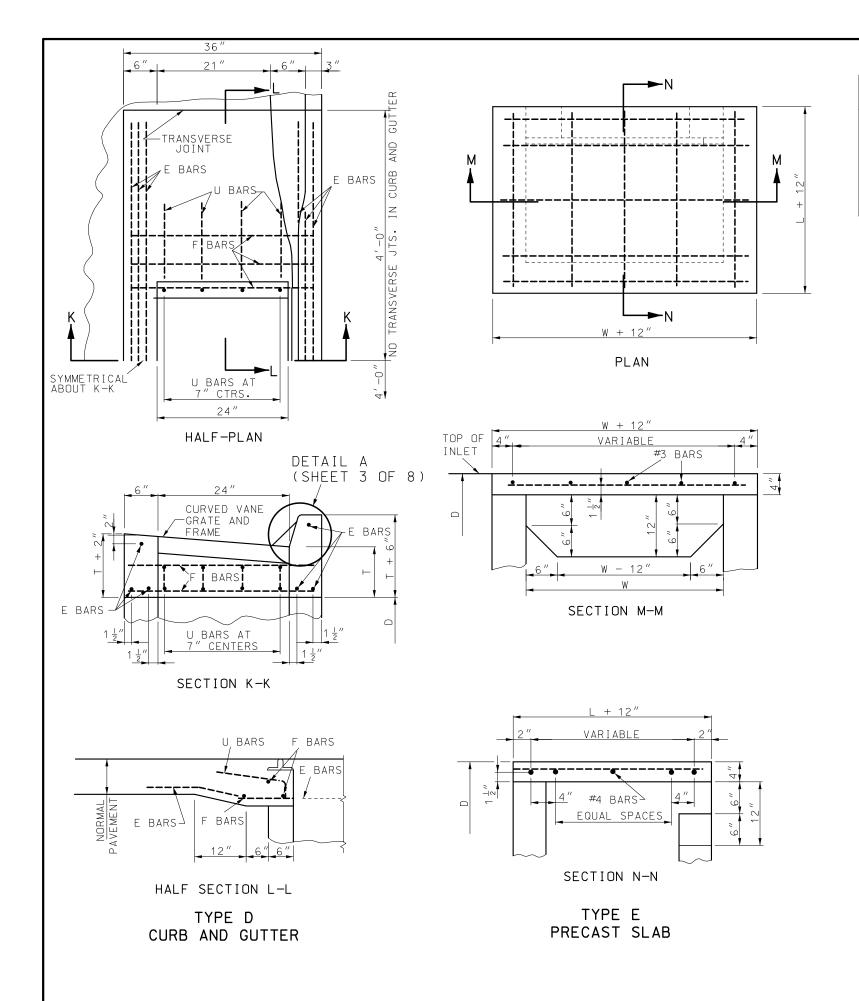
SECTION E-E



SECTION F-F

2 OF 8





PAVEMENT THICKNESS	"T" DIMENSION
LESS THAN OR EQUAL TO 11"	11"
12"	12″
13"	13"
GREATER THAN OR EQUAL TO 14"	14"

TYPE E COVER BAR BILL								
WIDTH	LENGTH	BAR SIZE	NO.	LENGTH				
3′	2′	#3	5	2'-9"				
)		#4	5	3′-9″				
3′	3 ′	#3	5	3′-9″				
)	)	#4	5	3′-9″				
5′	2′	#3	6	2'-9"				
ر		#4	6	5′-9″				
5 <i>′</i>	3′	#3	6	3′-9″				
)		#4	7	5′-9″				

GENERAL NOTES:

THE SIZE OF THE DROP INLET AND TYPE OF COVER WILL BE SHOWN ON THE PLANS.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH ESTABLISHED MANUFACTURING PROCEDURES.

TOP OF DROP INLET WALL SHALL BE CONSTRUCTED TO THE ELEVATION OF BOTTOM OF SLAB AT THE EDGE OF PAVEMENT OR BOTTOM OF CURB AND GUTTER AT DROP INLET.

WHERE THE DROP INLET IS LOCATED IN AN UNPAVED AREA, THE TOP OF THE DROP INLET WALLS SHALL BE SET TO THE ELEVATION SHOWN ON THE PLANS.

ALL CONCRETE ABOVE THE TAR PAPER SEPARATION JOINT IS TO BE CONSTRUCTED DURING PAVING OPERATIONS OR CURB AND GUTTER CONSTRUCTION, AND WILL BE PAID FOR AS SQUARE YARDS OF CONCRETE PAVEMENT OR LINEAR FEET OF CURB AND GUTTER.

FORMED OR CUT-OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

REINFORCING BARS IN PAVEMENT SHALL BE EPOXY COATED AND SECURELY TIED TOGETHER AND FASTENED TO AVOID ANY POSSIBLE DISPLACEMENT DURING THE PLACING OF CONCRETE, REINFORCEMENT SHOWN IS IN ADDITION TO ANY REINFORCEMENT SHOWN FOR CONCRETE PAVEMENT OR CURB AND GUTTER.

JOINTS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE DROP INLETS CALLED FOR IN THE PLANS, TO THE DIMENSIONS REQUIRED FOR PRECAST DROP INLETS.

WELDED WIRE REINFORCEMENT MAY BE IN LIEU OF REINFORCING BARS, THE REINFORCEMENT SHALL NOT BE LESS THAN .23 SQUARE INCHES PER LINEAR FOOT BOTH HORIZONTALLY AND VERTICALLY.

NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE NOR FOR CUTTING OR BENDING REINFORCING STEEL.

THE TOP OF INLET PIPES SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

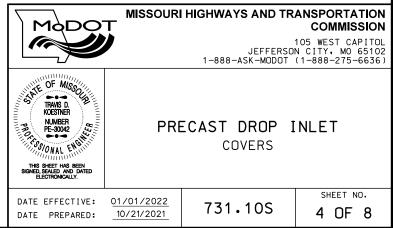
NO DIRECT PAYMENT WILL BE MADE FOR FORMING FOR CURVED VANE GRATES AND FRAMES.

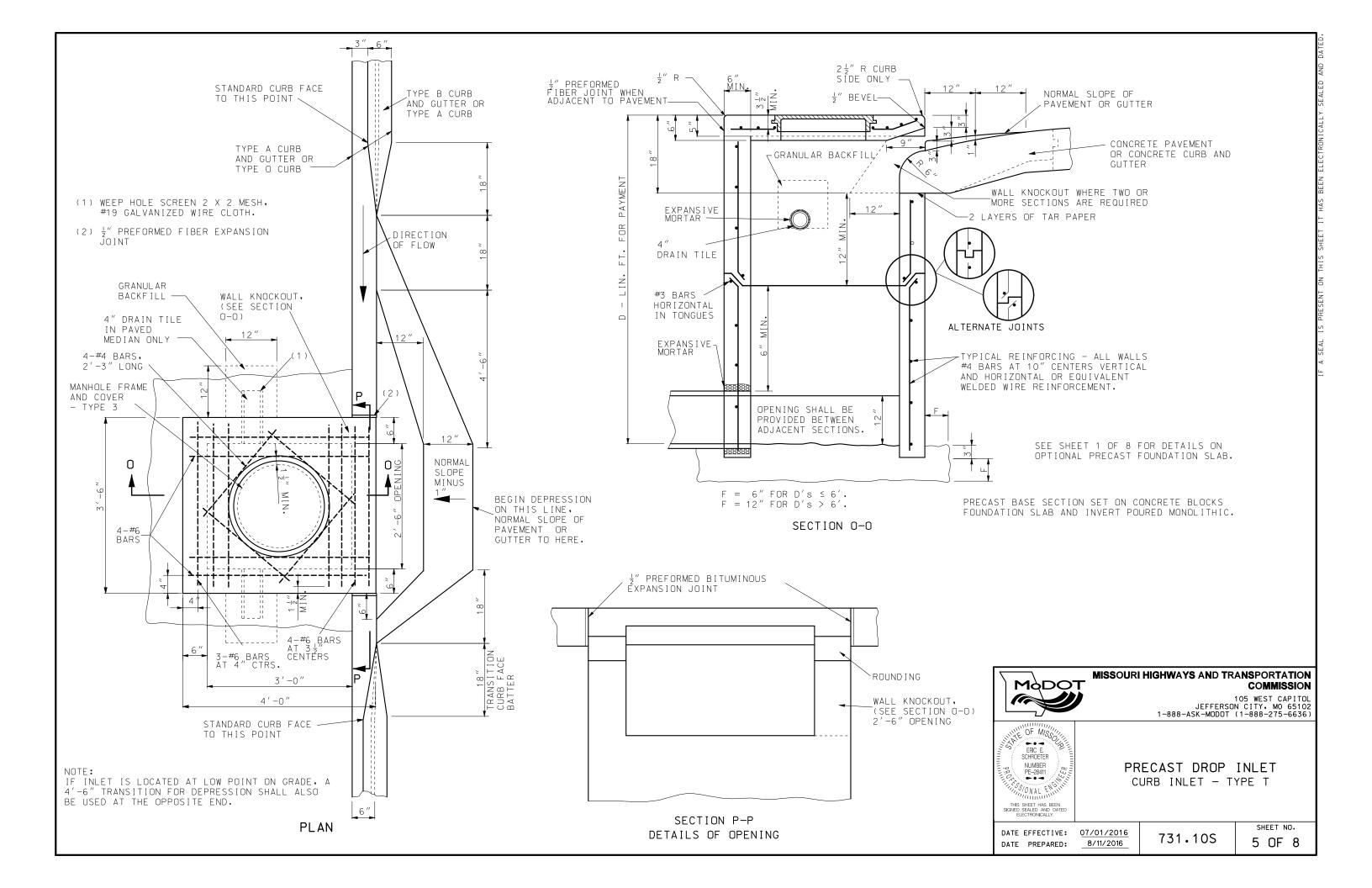
THE REINFORCEMENT SHOWN IS THE MINIMUM REQUIRED. AT THE CONTRACTOR'S OPTION, ADDITIONAL REINFORCEMENT MAY BE USED.

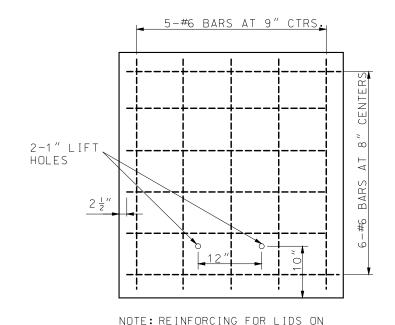
REINFORCING STEEL EDGE DISTANCE WILL BE 1  $\frac{1}{2}^{\prime\prime}$  UNLESS OTHERWISE SPECIFIED.

NOT MORE THEN TWO LIFT HOLES OR LIFTING INSERTS MAY BE PROVIDED.

CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL PLANES 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION OF THE DROP INLETS, CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

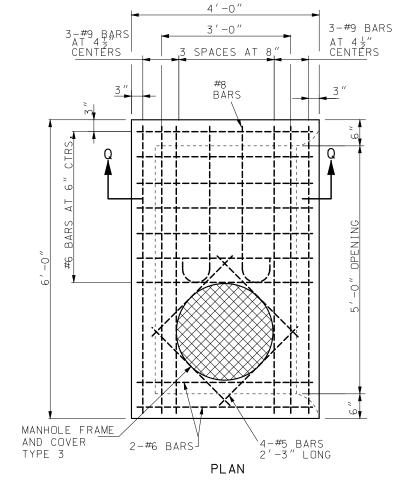


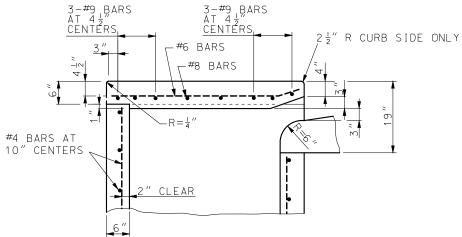




#### LID FOR ADJACENT SECTIONS

UPSTREAM SECTIONS.





SECTION Q-Q

## OPTIONAL PRECAST CURB INLET 5'-0" OPENING

OTHER DETAILS ARESAME AS FOR THE 2'-6" OPENING DROP INLET THIS SHEET.

GENERAL NOTES:

NOTES PERTAINING TO TYPE T:

THE LENGTH AND DEPTH OF THE INLET SHALL BE AS SHOWN ON THE PLANS.

WALLS BETWEEN THE ADJACENT SECTIONS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

IF DEPTH OF INLET EXCEEDS 6 FEET THE PRECAST UNITS MAY BE FURNISHED IN TWO OR MORE SECTIONS.

IF TWO OR MORE SECTIONS ARE USED, THE TYPE 3 MANHOLE FRAME AND COVER SHALL BE IN THE DOWNSTREAM SECTION ONLY.

IF A 5 FOOT OPENING IS REQUIRED, TWO 2'-6" OPENING SECTIONS OR ONE 5 FOOT OPEING SECTION MAY BE PROVIDED AT THE CONTRACTOR'S OPTION.

SEE SHEET 1 FOR STEP DETAILS AND SHEET 4 FOR GENERAL NOTES.



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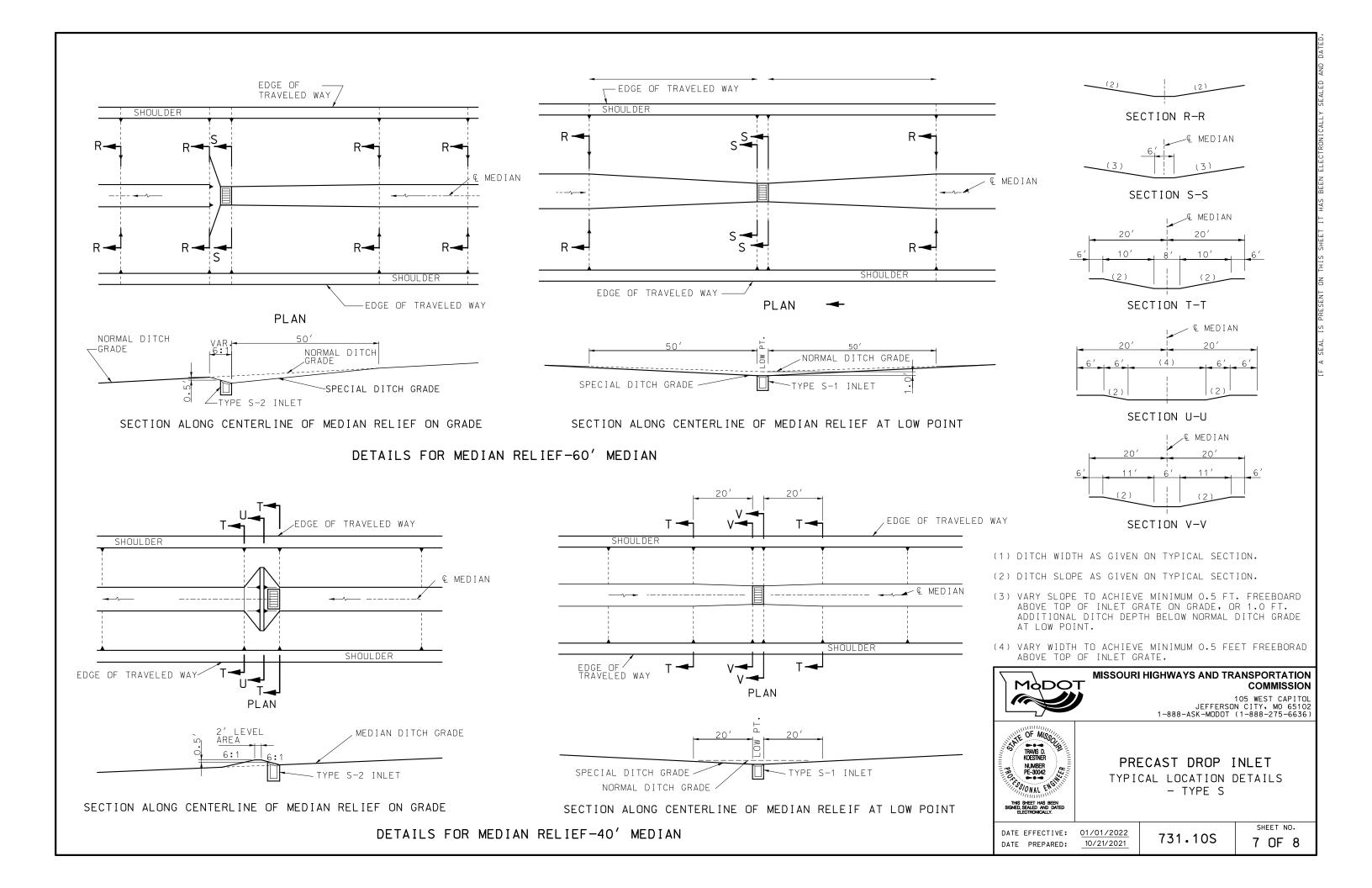
PRECAST DROP INLET CURB INLET - TYPE T

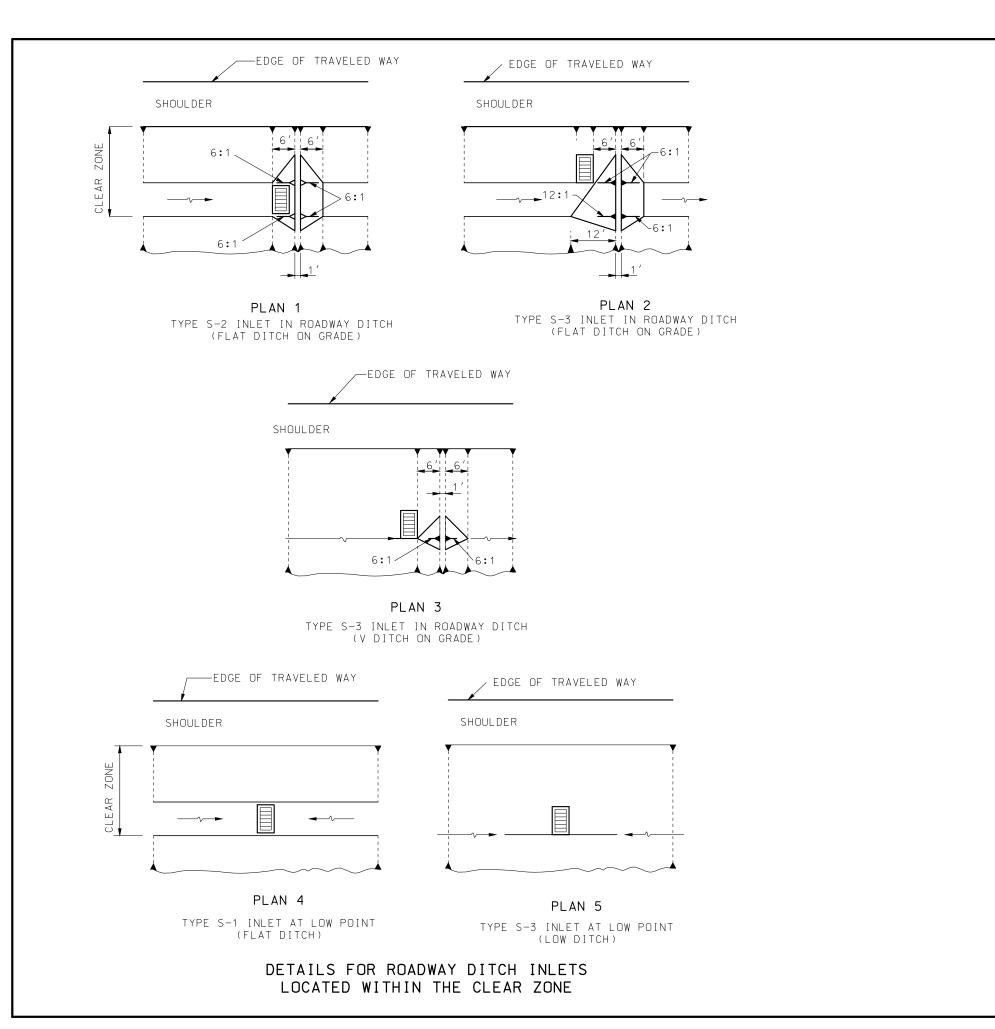
DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016

731.10S

SHEET NO. 6 OF 8

COMMISSION

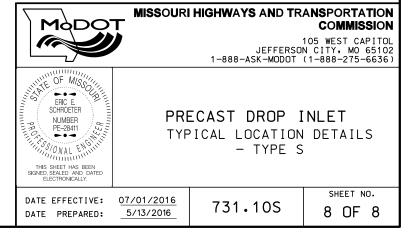


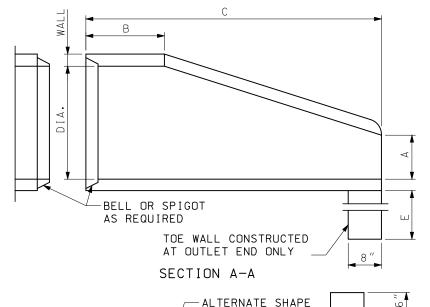


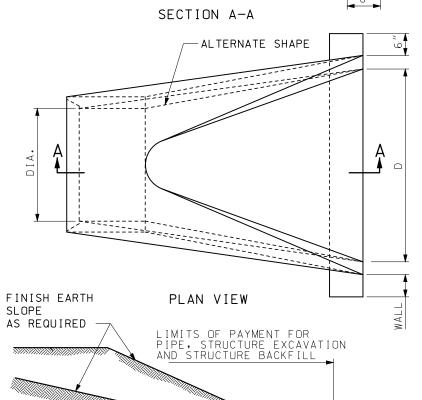
GENERAL NOTES:

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. ACTUAL CONSTRUCTION DETAILS SHALL CONFORM TO THOSE SHOWN ON THE DETAIL PLANS.

DETAILS ON THIS SHEET ARE ONLY FOR USE WITH STRUCTURE: LOCATED IN THE MEDIAN OR WITHIN THE CLEAR ZONE.

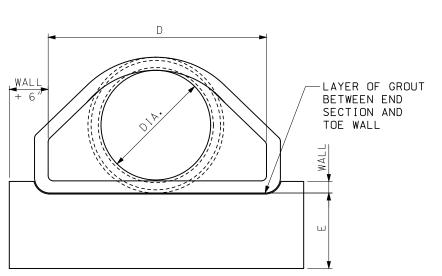






-CULVERT-

	DIMENSIONS										
DIA.	WALL	Α	B MIN.	C MIN.	D	E					
12"	2"	4 "	4′-0″	6′	2'-0"	18"					
15"	2 ¼"	6"	3'-10"	6′	2'-6"	18"					
18"	2 ½"	9"	3'-10"	6′	3′-0″	18"					
21"	2 <del>3</del> "	9"	3'-2"	6′	3′-6″	18"					
24"	3 "	9 <u>1</u> "	2'-6"	6′	4′-0″	24"					
27"	3 ¼"	10½"	2'-1"	6′	4′-6″	24"					
30"	3 ½"	1′-0″	1′-7″	6′	5′-0″	24"					
33″	3 <del>3</del> "	1′-2″	1′-7″	6′	5′-6″	24"					
36"	4 "	1′-3″	2'-10"	8′	6'-0"	24"					
42"	4 ½"	1′-9″	2'-11"	8′	6'-6"	24"					
48"	5 "	2'-0"	2'-2"	8′	7′-0″	24"					
54"	5 ½"	2'-3"	2'-11"	8′	7′-6″	36"					
60″	6″	2′-6″	3′-3″	8′	8′-0″	36"					
66"	6 ½"	2′-0″	1′-9″	8′	8′-6″	36"					
72″	7 "	2′-0″	2′-9″	10′	9'-0"	36"					
78″	7 <u>1</u> "	2'-3"	2'-3"	10′	9′-6″	36"					
84"	8 "	2′-6″	2′-0″	10′	10'-0"	36"					



	REINFORCEMENT										
		ARREL SECT EINFORCEM		FLARE SECTION REINFORCEMENT							
ADJOINING PIPE DIA.	CIRC	ULAR	ELLIPTICAL		YER ONLY OF WALL)						
	INNER CAGE SQ. IN./ LIN. FT.	OUTER CAGE SQ. IN./ LIN. FT.	SQ. IN./ LIN. FT.	AREA OF LONGITUDINAL SQ. IN./ LIN. FT.	AREA OF TRANSVERSE SQ. IN./ LIN. FT.						
12"	0.07			0.048	0.048						
15″	0.07			0.054	0.054						
18"	0.07		0.07	0.060	0.060						
21"	0.07		0.07	0.066	0.066						
24"	0.07		0.07	0.072	0.072						
27"	0.13		0.11	0.078	0.078						
30"	0.14		0.12	0.084	0.084						
33"	0.15		0.13	0.090	0.090						
36"	0.12	0.09	0.13	0.096	0.096						
42"	0.15	0.12	0.17	0.108	0.108						
48"	0.18	0.14	0.20	0.120	0.120						
54"	0.22	0.16	0.24	0.132	0.132						
60"	0.25	0.19	0.28	0.144	0.144						
66"	0.31	0.23	0.34	0.156	0.156						
72"	0.35	0.21	0.39	0.170	0.170						
78″	0.40	0.24	0.44	0.185	0.185						
84"	0.46	0.28	0.51	0.205	0.205						

#### GENERAL NOTES:

SLIGHT VARIATIONS IN BOTH SHAPE AND DIMENSIONS FROM THOSE SHOWN MAY BE ACCEPTED IF APPROVED BY THE

NOT MORE THAN THREE LIFT HOLES MAY BE DRILLED OR CAST IN THE END SECTION FOR HANDLING AND LAYING.

LIFT LUGS OR BARS WILL BE PERMITTED IN PRECAST TOE WALLS.

TOE WALLS MAY BE CAST-IN-PLACE OR PRECAST.

STEEL FIBERS MAY BE USED IN LIEU OF REBAR OR COLD DRAWN STEEL WIRE AS PER SECTION 1032.3.4.

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## FLARED END SECTION

PRECAST CONCRETE

DATE EFFECTIVE: 04/01/2016 DATE PREPARED:

2/11/2016

732.00S

SHEET NO. 1 OF 3

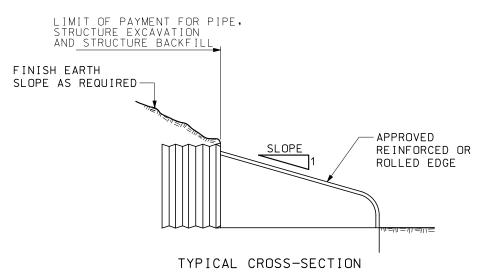
INSTALLATION DETAILS

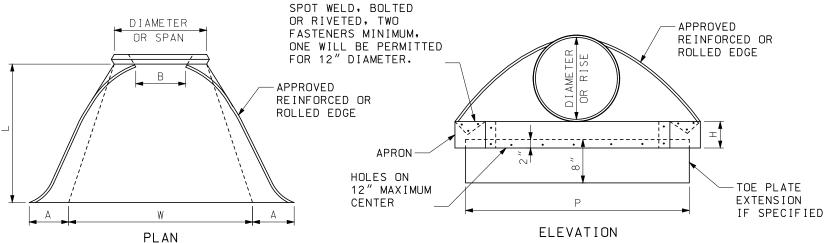
FLARED END SECTION-

END VIEW

	END SECTIONS FOR ARCH PIPE									
	ARCH	DIAMETER EQUIVALENT	GAL VAN I ZED SHEET	DIME	NS I OI	APPROXIMATE SLOPE	IOE PLATE IF			
TYPE	DIMENSIONS SPAN x RISE	ROUND PIPE	THICK IN.	A 1″ TOL.	B MAX.	H 1″ TOL.	L 1½″ TOL.	W 2″ TOL.	(V:H) (1:SLOPE)	SPECIFIED P,
B1		15	.064	6	9	6	19	30	2 <del> </del> 8	40
B2		18	.064	7	11	6	23	36	2	46
В3		21	.064	8	12	6	28	42	2 <del> </del> 8	52
B4	SEE	24	.064	8	16	6	32	48	2	58
B5	STANDARD	30	.079	10	16	6	39	60	1 7/8	70
B6 OR B6A	PLAN 725,00	36	.079	12	18	8	46	75	1 3/4	85
B7 OR B7A	723.00	42	.109	13	21	9	53	85	1 7/8	107
B8 OR B8A		48	.109	18	26	12	63	90	1 7/8	112
B9 OR B9A		54	.109	18	30	12	70	102	1 7/8	124
B10 OR B10A	A	60	.109	18	33	12	77	114	1 <del>7</del> 8	136
B11 OR B114	A	66	.109	18	36	12	77	126	1 <del>5</del>	148
B12 OR B12	A	72	.109	18	39	12	77	138	1 ½	160

END SECTIONS FOR ROUND PIPE								
PIPE	GAL VAN I ZED SHEET		DIN	ENSIONS		APPROXIMATE SLOPE	LINE LEVIE IL	
DIAMETER (IN.)	THICK (IN.)	A 1″ TOL.	B MAX.	H 1″ TOL.	L 1½″ TOL.	W 2″ TOL.	(V:H) (1:SLOPE)	SPECIFIED P, (IN.)
12	.064	6	6	6	21	24	2 <del>1</del> /2	34
15	.064	7	8	6	26	30	2 <del>1</del> 2	40
18	.064	8	10	6	31	36	$2\frac{1}{2}$	46
21	.064	9	12	6	36	42	$2\frac{1}{2}$	52
24	.064	10	13	6	41	48	2 <del>1</del> /2	58
30	.079	12	16	8	51	60	2 ½	70
36	.079	14	19	9	60	72	2 <del>1</del> /2	94
42	.109	16	22	11	69	84	$2\frac{1}{2}$	106
48	.109	18	27	12	78	90	$2\frac{1}{2}$	112
54	.109	18	30	12	84	102	2 OR 2 4	124
60	.109	18	33	12	87	114	1 3/4 OR 2	136
66	.109	18	36	12	87	120	1½ OR 2	144
72	.109	18	39	12	87	126	1 <del>1</del> OR 2	148
78	.109	18	42	12	87	132	1 4 OR 1 ½	154
84	.109	18	45	12	87	138	1 or 1 ½	160





END SECTION FOR PIPE AND PIPE ARCH

#### GENERAL NOTES:

MINOR VARIATIONS OF DETAIL AND DIMENSIONS WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE  $\frac{3}{8}^{\prime\prime}$  DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

TOE PLATE EXTENSIONS, IF SPECIFIED, SHALL HAVE HOLES TO MATCH HOLES IN TOE PLATE.

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" THROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

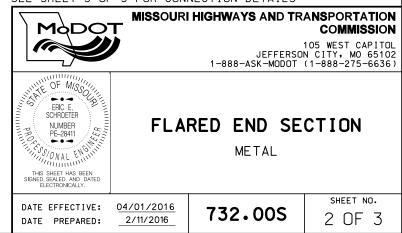
SKIRT SECTIONS FOR 30" AND LARGER PIPES AND B5 AND LARGER PIPE ARCHES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48" AND LARGER PIPES AND B8 OR LARGER PIPE ARCHES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

SKIRT SECTIONS FOR 72" AND LARGER PIPES MAY BE MADE FROM UP TO 4 SHEETS JOINED BY RIVETING AND BOLTING. THE BOTTOM PANEL SHALL BE 2 EQUAL WIDTH SHEETS JOINED ON CENTERLINE.

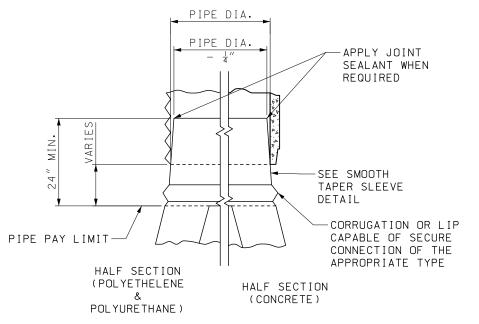
ALL 3 PIECE AND 4 PIECE SKIRTS FOR 60" OR LARGER PIPES AND B10 AND LARGER PIPE ARCHES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTIONS. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

SEE SHEET 3 OF 3 FOR CONNECTION DETAILS



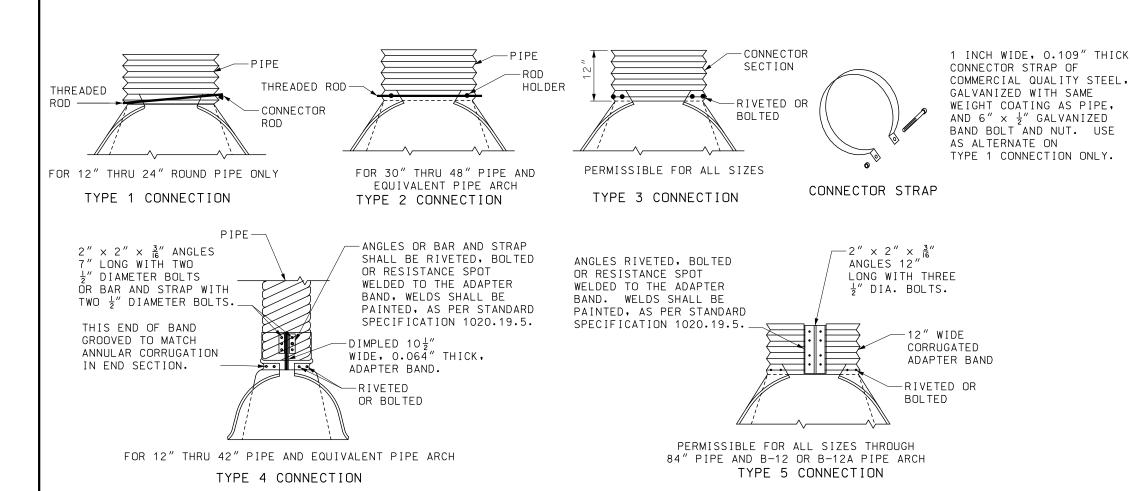
IF A SEAL IS PRESENT ON THIS SHEE

CONNECTION REQUIREMENTS								
	CONNECTION	ALLOWABLE	TAPERED SLEEVE REQUIREMENT					
TYPE	CONNECTION TYPE	SIZE RANGE (IN.)	CMP	RCP PVC	PP PE			
SAFETY END SECTION	2	ALL	N	Y	Y			
	1	12-24	N	Y	N			
METAL	2	ALL	N	Y	N			
FLARED	3	ALL	N	Y	N			
END SECTION	4	12-24	N	Y	N			
	5	12-24	N	Y	N			

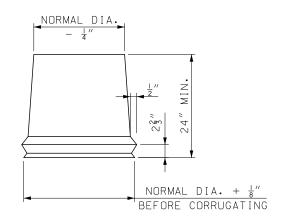


TAPERED SLEEVE CONNECTION FOR CONCRETE AND THERMOPLASTIC PIPE

TAPERED SLEEVE SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.



END SECTION FOR PIPE AND PIPE ARCH



FORM  $\frac{1}{2}$ " X  $2\frac{2}{3}$ " CORRUGATIONS. MAINTAIN INSIDE DIAMETER OF SLEEVE. FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER. SMOOTH TAPERED SLEEVE DETAIL

GENERAL NOTES:

MINOR VARIATIONS OF DETAIL AND DIMENSIONS WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

TAPERED SLEEVES SHALL BE FABRICATED FROM SMOOTH 12 GUAGE STEEL COATED IN ACCORDANCE WITH AASHTO M-218.

TAPERED SLEEVES SHALL BE FIRMLY WEDGED INTO THE PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.

THE LENGTH OF TAPERED SLEEVE SHALL BE SIZED TO PROTECT UV SENSITIVE PIPE MATERIALS FROM SUNLIGHT. THE ENTIRE COST OF THE TAPERED SLEEVE, HARDWARE, AND INSTALLATION SHALL BE INCLUDED IN THE COST OF THE PIPE.

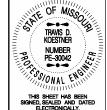
TAPERED SLEEVES SHALL HAVE AT A MINIMUM A HALF CORRUGATION OR LIP DESIGNED TO PROVIDE A SECURE CONNECTION WITH THE END SECTION.

ANY ROD OR STRAP USED FOR MAKING A CONNECTION SHALL BE SECURLY SEATED INTO A VALLEY OF THE PIPE CORRUGATION. THE VALLEY CHOOSEN TO HOLD THE ROD OR STRAP SHALL LEAVE AT LEAST ONE FULL INTACT CORRUGATION BEFORE THE END OF THE PIPE. THE FEMALE PORTION OF A BELL END SHALL NOT COUNT AS A FULL INTACT CORRUGATION.



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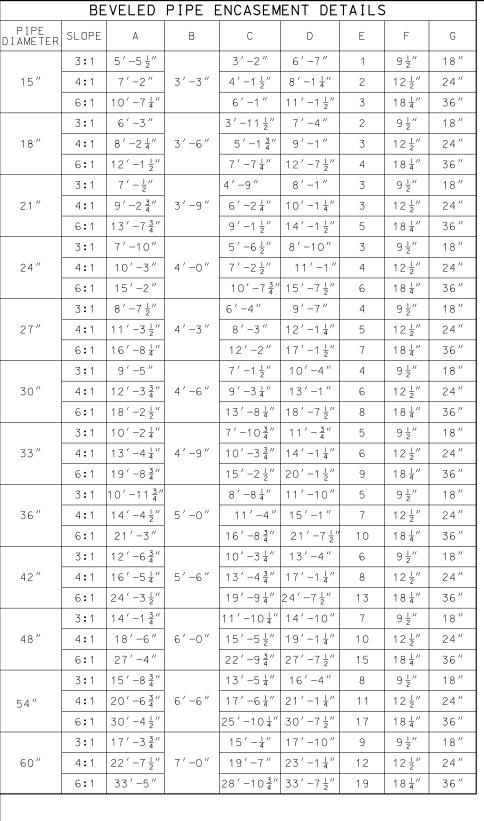
## FLARED END SECTION

METAL

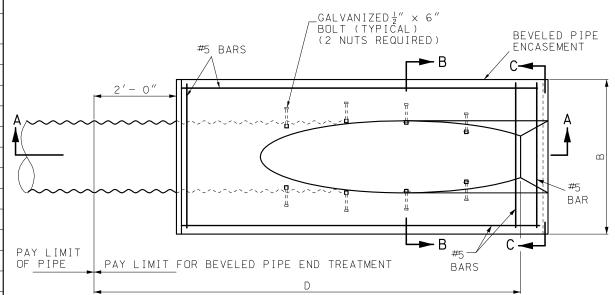
DATE EFFECTIVE: 07/01/2021 DATE PREPARED:

4/29/2021

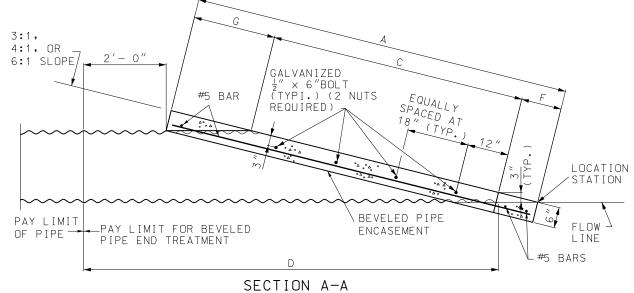
732.00S



SECTION B-B



## PLAN VIEW FOR HIGHWAYS



#### GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.

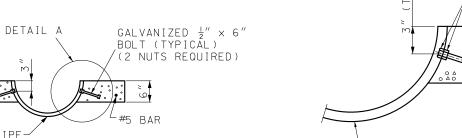
REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

THE  $\frac{1}{2}$ "  $\times$  6" BOLT AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 (ASTM A153), CLASS C SPECIFICATIONS. LOW CARBON STEEL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF  $\frac{1}{2}$ "  $\times$  6" GALVANIZED BOLTS. THE  $\frac{1}{2}$ "  $\times$  6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.



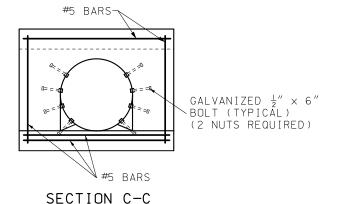
GALVANIZED  $\frac{1}{2}$ " × 6" BOLT (TYPICÁL) DETAIL A

HEAVY HEX

GALVANZIED NUT

SIDE OF PIPE)

(ONE PLACED EACH





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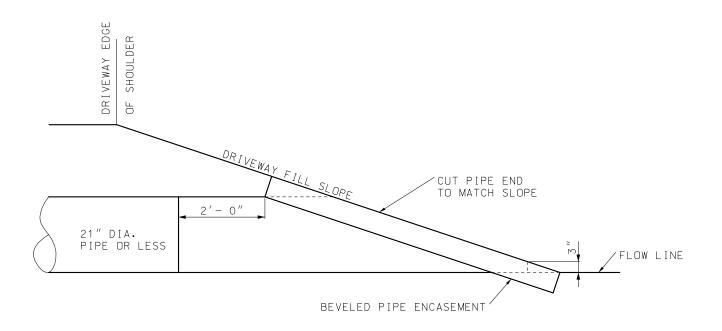


## BEVELED PIPE END **TREATMENT** FOR HIGHWAYS

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

10/14/2020

732.05D



## PIPE END DETAILS FOR PARALLEL DRAINAGE STRUCTURES FOR DRIVEWAYS

(SINGLE PIPE INSTALLATION)

#### NOTE:

FOR MULTIPLE PIPE INSTALLATIONS, END SECTIONS WITH SAFETY BARS SYSTEM OR OPTIONAL BAR GATE SYSTEM SHALL BE PROVIDED. SEE STANDARD PLAN 732.10.

SEE DRIVEWAY STANDARD PLANS FOR BEVELED END SECTION REQUIREMENTS.

#### GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.

REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASE-MENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

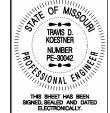
THE  $\frac{1}{2}$ "  $\times$  6" BOLT AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 (ASTM A153), CLASS C SPECIFICATIONS. LOW CARBON STEEL ANCHOR BOLTS SHALL BE ASTM F1554, GRADE 36.

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF  $\frac{1}{2}$ "  $\times$  6" GALVANIZED BOLTS. THE  $\frac{1}{2}$ "  $\times$  6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.



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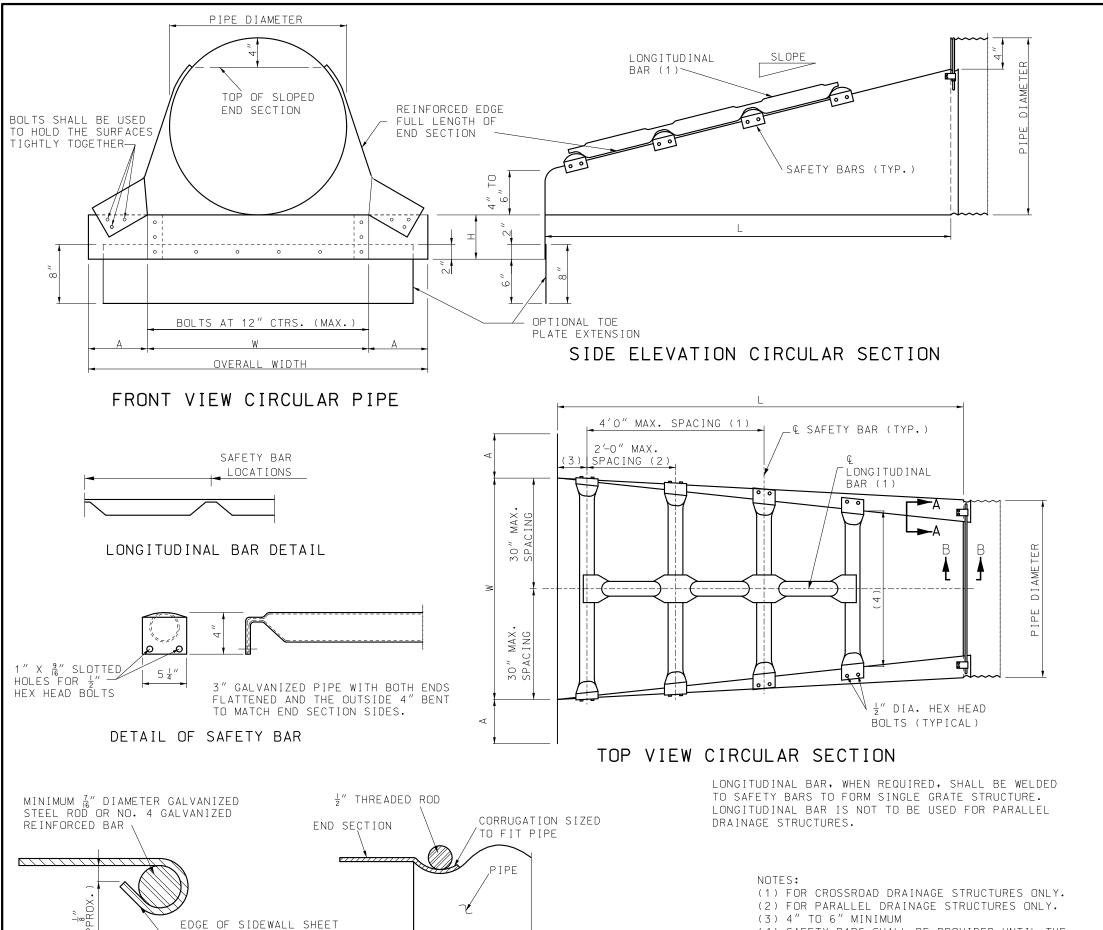


## BEVELED PIPE END TREATMENT FOR DRIVEWAYS

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

10/14/2020

732.05D



SECTION B-B

SHALL BE ROLLED SNUGLY

SECTION A-A

AGAINST STEEL ROD OR BAR.

GENERAL NOTES:

END SECTIONS, INCLUDING ALL BOLTS, NUTS, RODS AND STRAPS, SHALL BE FABRICATED FROM GALVANIZED STEEL MEETING THE REQUIREMENTS OF SECTION 1020.

ALL BOLTS UNLESS OTHERWISE SHOWN SHALL BE ASTM A307

WHEN REQUIRED, OPTIONAL TOE PLATE EXTENSION SHALL BE PUNCHED OR DRILLED AND BOLTED TO END SECTION TOE PLATE, STEEL FOR TOE PLATE EXTENSION SHALL BE SAME GAUGE AS END SECTION. DIMENSIONS SHALL BE OVERALL WIDTH LESS 6' BY 8" HIGH.

ATTACHMENT TO CIRCULAR PIPES 15" THROUGH 24" DIAMETER SHALL BE MADE WITH TYPE #1 STRAPS. ALL OTHER SIZES SHALL BE ATTACHED WITH TYPE #2 CONNECTORS.

SAFETY BARS AND LONGITUDINAL BARS SHALL BE FABRICATED FROM STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53 SCHEDULE 40 SPECIFICATIONS. SAFETY BARS AND LONGITUDINAL BARS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1020 OF STANDARD SPECIFICATIONS.

INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 725 AND 732 OF THE STANDARD SPECIFICATIONS.

SLOTTED HOLES FOR SAFETY BAR ATTACHMENT SHALL BE PROVIDED FOR ALL END SECTIONS.

MINOR VARIATIONS OF DETAIL WILL BE ACCECTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE 3" DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN,

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" TROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

SKIRT SECTIONS FOR 30" AND LARGER PIPES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

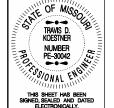
SKIRT SECTIONS FROM 48" AND LARGER PIPES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

ALL 3 PIECE SKIRTS FOR 60" PIPES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTION. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.



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## SAFETY SLOPE END SECTION

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

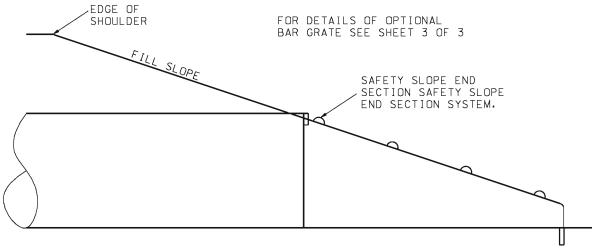
(4) SAFETY BARS SHALL BE PROVIDED UNTIL THE

OR EQUAL TO 30".

LATERAL SPAN OF THE OPENING IS LESS THAN

10/14/2020

732.10H



## PIPE END DETAILS FOR DRAINAGE STRUCTURES

(SINGLE PIPE INSTALLATION)

SEE DRIVEWAY STANDARD PLANS FOR BEVELED END SECTION REQUIREMENT.

FOR CONNECTION DETAILS, SEE 732.00 SHEET 3 OF 3.

	METAL END SECTIONS FOR CIRCULAR PIPES											
PIPE	MIN. GAUGE	MIN. GAUGE	- DIMENSIONS IN INCHES					L DIMENSIONS				
DIA.	ENDS (IN.)		Α	Н	W	OVERALL	SLOPE	LENGTH	SLOPE	LENGTH	SLOPE	LENGTH
(IN.)	4:1 & 6:1	10:1	1″ TOL.	1" TOL.	2″ TOL.	WIDTH		(IN.)		(IN.)		(IN.)
15	16	12	8	6	21	37	4:1	20	6:1	30	10:1	70
18	16	12	8	6	24	40	4:1	32	6:1	48	10:1	100
21	16	12	8	6	27	43	4:1	44	6:1	66	10:1	130
24	16	12	8	6	30	46	4:1	56	6:1	84	10:1	160
30	12		12	9	36	60	4:1	80	6:1	120	10:1	220
36	12		12	9	42	66	4:1	104	6:1	156	10:1	280
42	12		16	12	48	80	4:1	128	6:1	192		
48	12		16	12	54	86	4:1	152	6:1	228		
54	12		16	12	60	92	4:1	176	6:1	264		
60	12		16	12	66	98	4:1	200	6:1	300		



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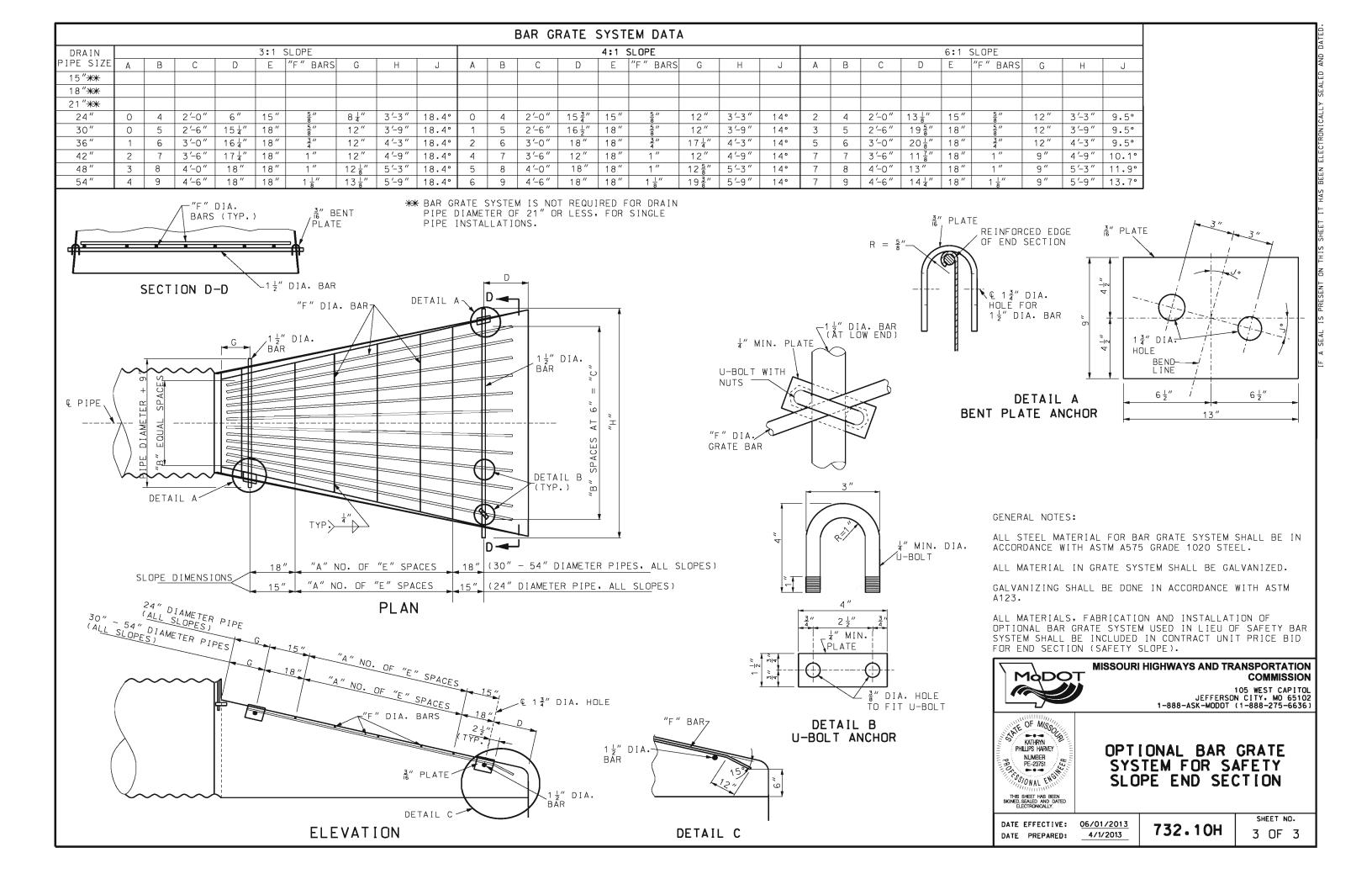
KATHRYN PHILIPS HARVEY NUMBER PE-23751 SSONAL ENGINEER

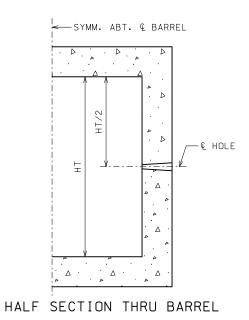
SAFETY SLOPE END SECTION

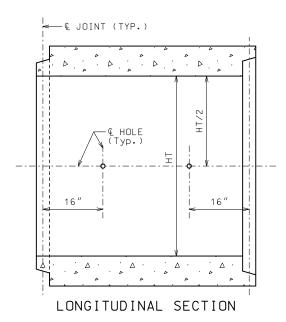
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

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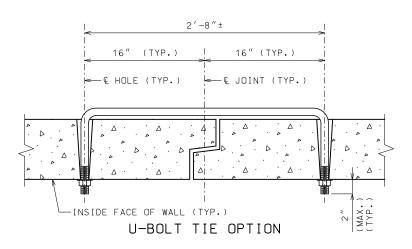
732.10H

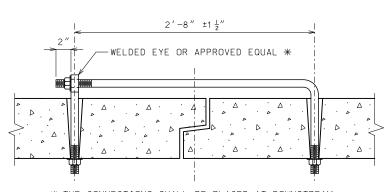




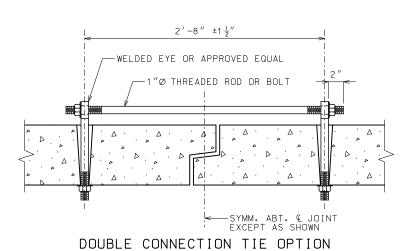


PLACEMENT OF HOLES

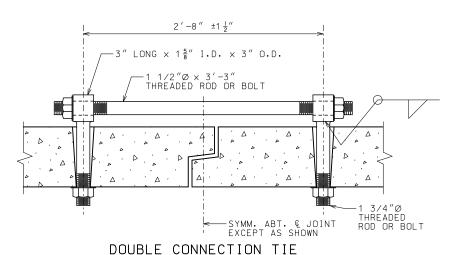




\* THE CONNECTIONS SHALL BE PLACED AT DOWNSTREAM END WHEN PLACED INSIDE OF STRUCTURE. EYE BOLT TIE OPTION



REGULAR STRENGTH CONNECTION DETAILS



## EXTRA STRENGTH CONNECTION DETAILS

#### GENERAL NOTES:

TIES SHALL BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

ALL PARTS OF THE TIE ASSEMBLY EXCEPT FOR ANCHORAGE SHALL BE LOCATED ON THE FILL FACE. ANCHORAGE THAT IS DIFFERENT THAN SHOWN SHALL BE APPROVED BY THE ENGINEER.

TIES SHALL ONLY BE USED FOR CONNECTING ADJACENT PRECAST SECTIONS. TIES ARE NOT TO BE USED TO CONNECT PRECAST TO CAST-IN-PLACE SECTIONS.

HOLES:
HOLES SHALL BE CAST OR DRILLED 16 INCHES FROM CENTERLINE OF
JOINT AS SHOWN, UNLESS FORMS ARE SET UP FOR 16-INCH SPACING
FROM OUTSIDE OF JOINT.

TAPERED HOLES ARE PERMITTED WHEN PRECAST.

REGULAR STRENGTH CONNECTIONS: REGULAR STRENGTH CULVERT TIES SHALL BE 1"0 THREADED RODS.

TIE RODS FOR REGULAR STRENGTH CONNECTIONS SHALL BE GALVANIZED IN ACCORDANCE WITH SEC 1081.

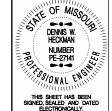
EXTRA STRENGTH CONNECTIONS:
THREADED RODS FOR EXTRA STRENGTH CONNECTIONS SHALL BE
STAINLESS STEEL IN ACCORDANCE WITH ASTM A193 OR A320.

NUTS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A194 AND OF GRADE EQUIVALENT TO GRADE USED FOR THREADED RODS.



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## PRECAST CONCRETE BOX CULVERT TIES

**DATE EFFECTIVE:** 07/01/2021 DATE PREPARED:

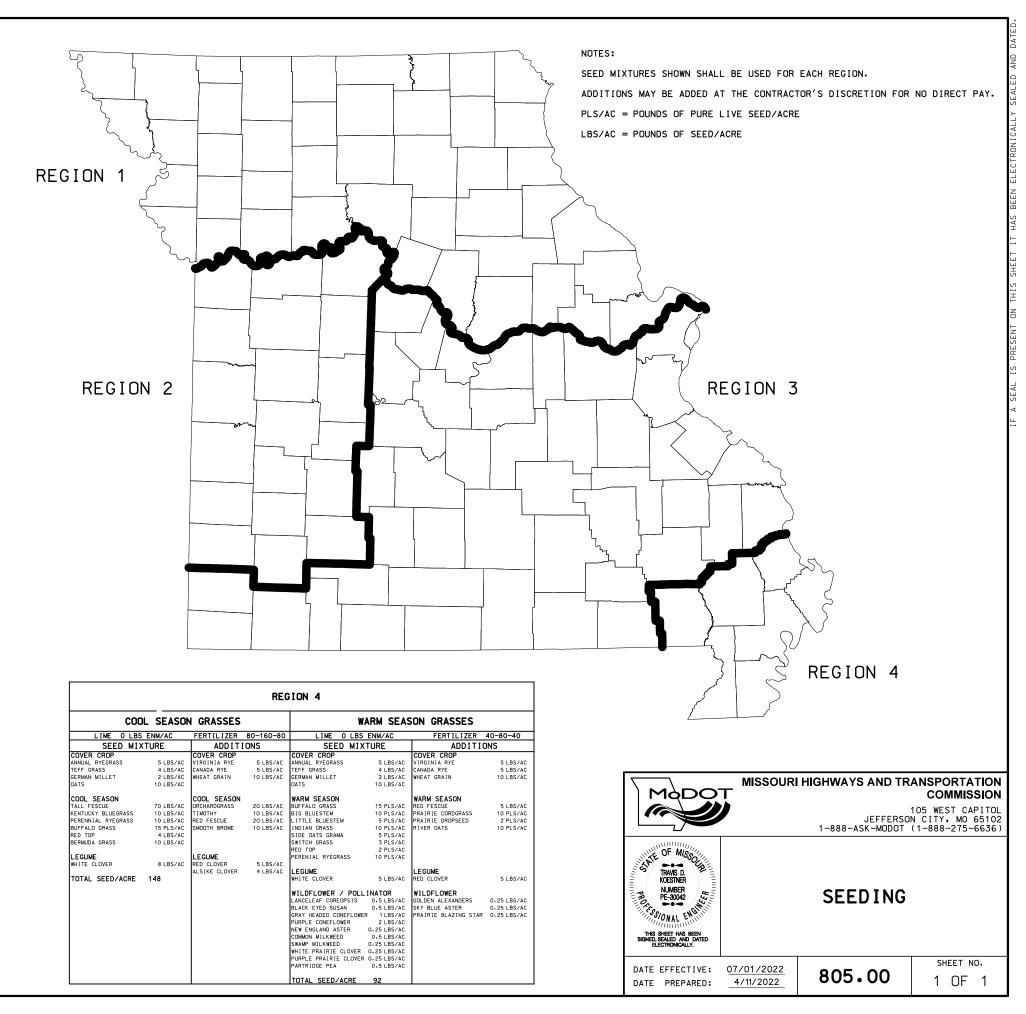
5/3/2021

733.00

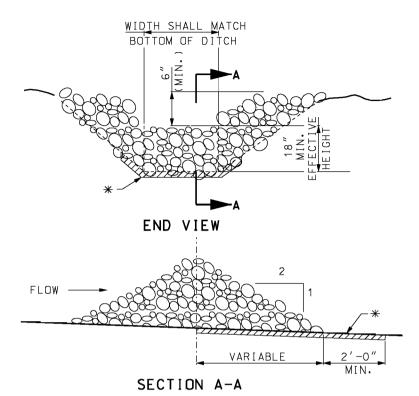
COOL	. SEASON	GRASSES		W.	ARM SEAS	ON GRASSES	
LIME 0 LBS	ENM/AC	FERTILIZER	80-160-80	LIME O LBS	ENM/AC	FERTILIZER 4	0-80-40
SEED MIXT	TURE	ADDITI	ONS	SEED MIX	TURE	ADDITIO	NS
COVER CROP ANNUAL RYEGRASS TEFF GRASS SERMAN MILLET DATS  COOL SEASON TALL FESCUE CENTUCKY BLUEGRASS SERENNIAL RYEGRASS BUFFALO GRASS RED TOP  LEGUME HHITE CLOVER	5 LBS/AC 4 LBS/AC 2 LBS/AC 10 LBS/AC 70 LBS/AC 20 LBS/AC 10 LBS/AC 15 PLS/AC 4 LBS/AC	COVER CROP VIRGINIA RYE CANADA RYE WHEAT GRAIN  COOL SEASON ORCHARDGRASS TIMOTHY RED FESCUE SMOOTH BROME  LEGUME RED CLOVER	10 LBS/AC	COVER CROP ANNUAL RYEGRASS TEFF GRASS GERMAN MILLET OATS WARM SEASON BUFFALO GRASS BIO BLUESTEM LITTLE BLUESTEM INDIAN GRASS SIDE OATS GRAMS SWITCH GRASS RED TOP PERENIAL RYEGRASS	10 LBS/AC 15 PLS/AC 10 PLS/AC 5 PLS/AC	COVER CROP VIRGINIA RYE CANADA RYE WHEAT GRAIN WARM SEASON RED FESCUE PRAIRIE CORDGRASS PRAIRIE DROPSEED RIVER OATS	5 LBS/A 5 LBS/A 10 LBS/A 5 LBS/A 10 PLS/A 2 PLS/A
TOTAL SEED/ACRE	148	ALSIKE CLOVER	4 LBS/AC	WILDFLOWER / POLL LANCELEAF COREOPSIS BLACK EYED SUSAN GRAY HEADED CONEFLOWER NEW ENCLAND ASTER COMMON MILKWEED WHITE PRAIRIE CLOVER PURPLE PRAIRIE CLOVER PARTRIDGE PEA	5 LBS/AC  .INATOR  0.5 LBS/AC  0.5 LBS/AC  2 LBS/AC  0.25 LBS/AC  0.25 LBS/AC  0.25 LBS/AC  0.25 LBS/AC  0.25 LBS/AC	LEGUME RED CLOVER WILDFLOWER GOLDEN ALEXANDERS SKY BLUE ASTER PRAIRIE BLAZING STAR	5 LBS/A 0.25 LBS/A 0.25 LBS/A

			REC	SION 2			
C00l	L SEASON	GRASSES		WA	ARM SEAS	ON GRASSES	
LIME 1000 LB	S ENM/AC	FERT IL IZER	80-80-80	LIME 600 LBS	ENM/AC	FERTILIZER 4	0-40-40
SEED MIX	TURE	ADDITI	ONS	SEED MIX	TURE	ADDITION	NS
COVER CROP ANNUAL RYEGRASS TEFF GRASS GERMAN MILLET OATS	5 LBS/AC 4 LBS/AC 2 LBS/AC 10 LBS/AC	COVER CROP VIRGINIA RYE CANADA RYE WHEAT GRAIN	5 LBS/AC 5 LBS/AC 10 LBS/AC	COVER CROP ANNUAL RYEGRASS TEFF GRASS GERMAN MILLET DATS	5 LBS/AC 4 LBS/AC 2 LBS/AC 10 LBS/AC	COVER CROP VIRGINIA RYE CANADA RYE WHEAT GRAIN	5 LBS/AC 5 LBS/AC 10 LBS/AC
COOL SEASON TALL FESCUE KENTUCKY BLUEGRASS PERENNIAL RYEGRASS BUFFALO GRASS RED TOP BERMUDA GRASS LEGUME WHITE GLOVER	70 LBS/AC 10 LBS/AC 10 LBS/AC 15 PLS/AC 4 LBS/AC	COOL SEASON ORCHARDGRASS TIMOTHY RED FESCUE SMOOTH BROME	20 LBS/AC 10 LBS/AC 20 LBS/AC 10 LBS/AC	WARM SEASON BUFFALO GRASS BIG BLUESTEM LITTLE BLUESTEM INDIAN GRASS SIDE DATS GRAMA SWITCH GRASS RED TOP PERENIAL RYEGRASS	15 PLS/AC 10 PLS/AC 5 PLS/AC 10 PLS/AC 5 PLS/AC 3 PLS/AC 2 PLS/AC 10 PLS/AC	WARM SEASON RED FESCUE PRAIRIE CONGGRASS PRAIRIE DROPSEED RIVER DATS	5 LBS/AC 10 PLS/AC 2 PLS/AC 10 PLS/AC
TOTAL SEED/ACRE	8 LBS/AC 148	RED CLOVER ALSIKE CLOVER	5 LBS/AC 4 LBS/AC	LEGUME WHITE CLOVER	5 LBS/AC	LEGUME RED CLOVER	5 LBS/AC
				WILDFLOWER / POLI LANCELEAF COREOPSIS BLACK EYED SUSAN GRAY HEADED CONEFLOWER NEW ENGLAND ASTER COMMON MILKWEED SWAMP MILKWEED WHITE PRAIRIE CLOVER PURPLE PRAIRIE CLOVER PARTRIDGE PEA	0.5 LBS/AC 0.5 LBS/AC IR 1 LBS/AC 2 LBS/AC 0.25 LBS/AC 0.5 LBS/AC 0.25 LBS/AC 0.25 LBS/AC	WILDFLOWER GOLDEN ALEXANDERS SKY BLUE ASTER PRAIRIE BLAZING STAR	0.25 LBS/AC 0.25 LBS/AC 0.25 LBS/AC

		REG	104 2			
COOL SEASON GRASSES				ARM SEAS	ON GRASSES	
S ENM/AC	FERTILIZER	80-240-80	LIME 1000 LB	S ENM/AC	FERTILIZER 4	0-120-40
TURE	ADDITI	ONS	SEED MIX	TURE	ADDITIO	NS
5 LBS/AC 4 LBS/AC 2 LBS/AC	COVER CROP VIRGINIA RYE CANADA RYE WHEAT GRAIN	5 LBS/AC 5 LBS/AC 10 LBS/AC	COVER CROP ANNUAL RYEGRASS TEFF GRASS GERMAN MILLET	5 LBS/AC 4 LBS/AC 2 LBS/AC	COVER CROP VIRGINIA RYE CANADA RYE WHEAT GRAIN	5 LBS/A 5 LBS/A 10 LBS/A
70 LBS/AC 10 LBS/AC 10 LBS/AC 15 PLS/AC 4 LBS/AC 10 LBS/AC 8 LBS/AC	COOL SEASON ORCHARDGRASS TIMOTHY RED FESCUE SMOOTH BROME LEGUME RED CLOVER ALSIKE CLOVER	10 LBS/AC 20 LBS/AC 10 LBS/AC	BIG BLUESTEM LITTLE BLUESTEM INDIAN GRASS SIDE DATS GRAMA SWITCH GRASS RED TOP PERENIAL RYEGRASS LEGUME	15 PLS/AC 10 PLS/AC 5 PLS/AC 10 PLS/AC 5 PLS/AC 3 PLS/AC 2 PLS/AC	WARM SEASON RED FESCUE PRAIRIE CORDGRASS PRAIRIE DROPSEED RIVER DATS  LEGUME BED CLOVER	5 LBS/A 10 PLS/A 2 PLS/A 10 PLS/A
140			WILDFLOWER / POL LANCELEAF COREOPSIS BLACK EYED SUSAN GRAY HEADED CONEFLOW PURPLE CONFELOWER NEW ENGLAND ASTER COMMON MILKWEED SWAMP MILKWEED WHITE PRAIRIE CLOVER	L INATOR  0.5 LBS/AC  0.5 LBS/AC  2 LBS/AC  0.25 LBS/AC  0.25 LBS/AC  0.25 LBS/AC  0.25 LBS/AC	WILDFLOWER GOLDEN ALEXANDERS SKY BLUE ASTER PRAIRIE BLAZING STAR	0.25 LBS/A 0.25 LBS/A
	S ENM/AC TURE  5 LBS/AC 4 LBS/AC 2 LBS/AC 10 LBS/AC 10 LBS/AC 10 LBS/AC 10 LBS/AC 15 PLS/AC 4 LBS/AC 10 LBS/AC	S ENM/AC	SEASON GRASSES   SENM/AC   FERTILIZER   80-240-80	L SEASON GRASSES  S ENM/AC FERTILIZER 80-240-80 LIME 1000 LB TURE ADDITIONS SEED MIX  COVER CROP  5 LBS/AC CARADA RYE 5 LBS/AC TEFF GRASS 10 LBS/AC TIMOTHY 10 LBS/AC TO BES/AC	S ENM/AC	L SEASON GRASSES



## ROCK DITCH CHECK



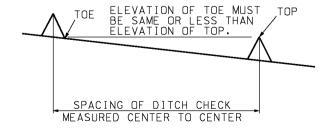
\* GEOTEXTILE LINING MAY BE INSTALLED AS REQUIRED BY THE ENGINEER.

#### NOTE:

ROCK DITCH CHECK IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.

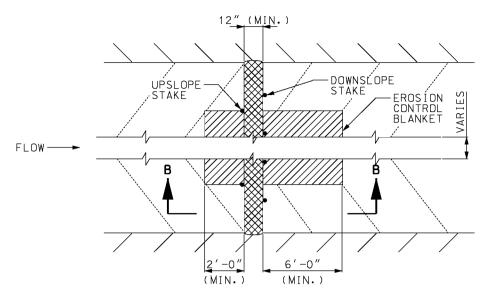
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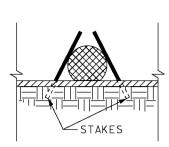
	EXAMPLE								
	CH CHECK S	SPACING							
FOR	STANDARD	HEIGHTS							
	(FT.)								
DITCH € SLOPE %	SPACING FOR 9" EFF. HEIGHT	SPACING FOR 18" EFF. HEIGHT							
0.5	150	300							
1.0	75	150							
1.5	50	100							
2.0	37	75							
2.5	30	60							
3.0	25	50							
3.5	21	43							
4.0	19	38							
4.5	16	33							
5.0	15	30							
5.5	13	27							
6.0	12	25							
6.5	11	23							
7.0	10	21							
7.5	10	20							
8.0	9	19							
8.5	9	18							
9.0	8	17							
9.5	8	16							
10.0	7	15							



MINIMUM DITCH CHECK SPACING

#### ALTERNATE DITCH CHECK

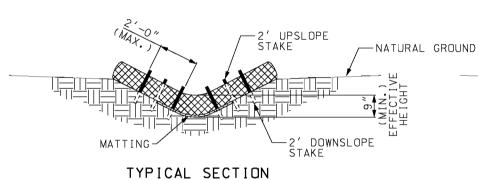




SECTION B-B

2' UPSLOPE

PLAN VIEW



DOWNSLOPE MATTING

TYPICAL SECTION TRAPEZOIDAL DITCH

VEE DITCH

#### NOTES:

USE MINIMUM 12 IN. DIAMETER LOG/SOCK.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL LOG/SOCK TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND LOG/SOCK AND SCOUR DITCH SLOPES OR AS DIRECTED BY ENGINEER.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE LOG/SDCK TO BOTTOM OF DITCH.

EROSION CONTROL BLANKET SHALL BE ANCHORED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

#### GENERAL NOTES:

OTHER PROPRIETARY DITCH CHECKS MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.

INSTALLATION OF PROPRIETARY DITCH CHECKS SHALL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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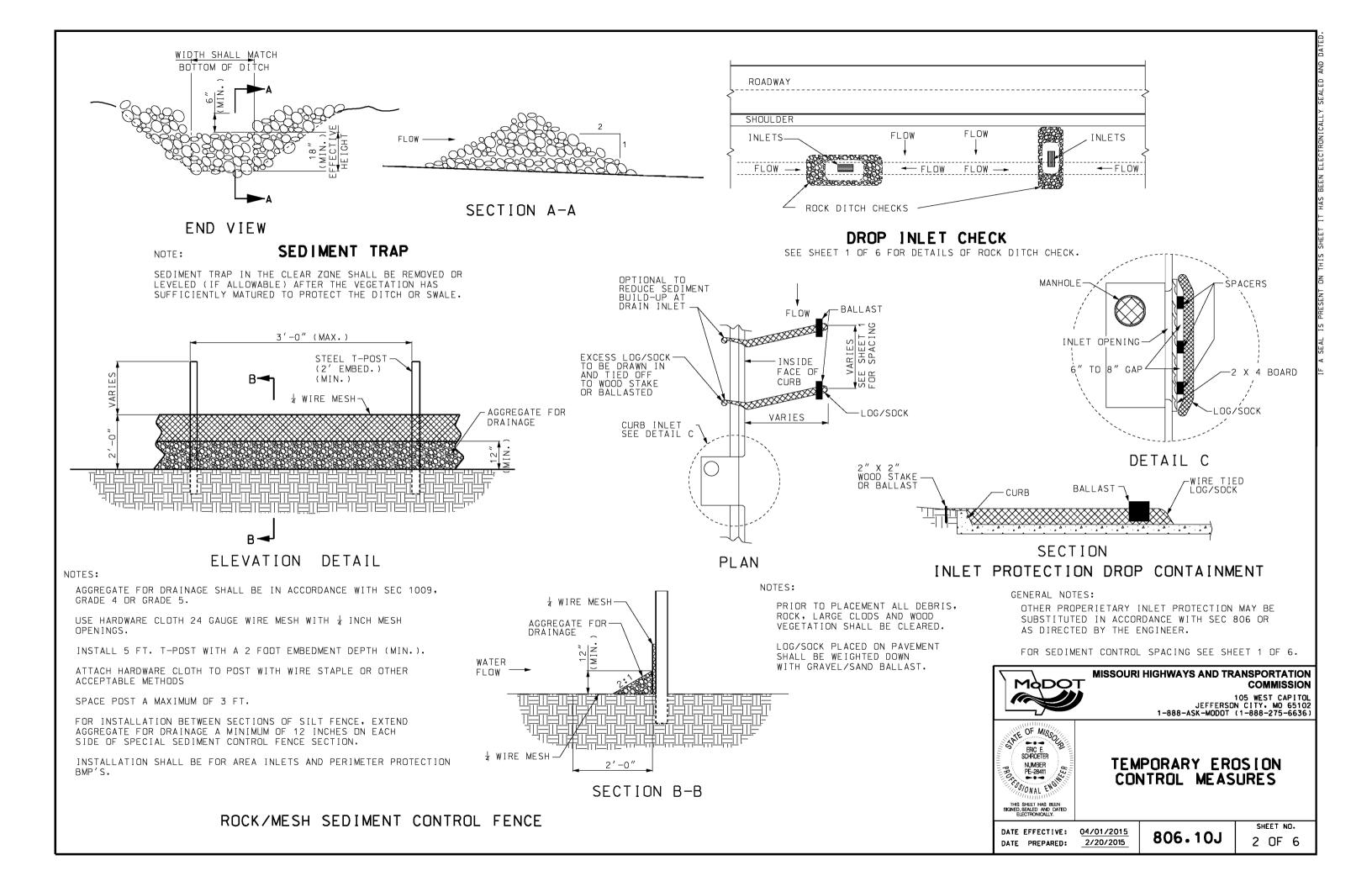
## TEMPORARY EROSION CONTROL MEASURES

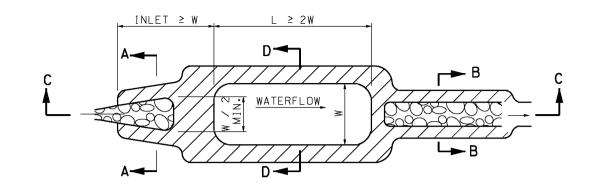
TEMPORARY DITCH CHECKS

DATE EFFECTIVE: 04/01/2015 DATE PREPARED:

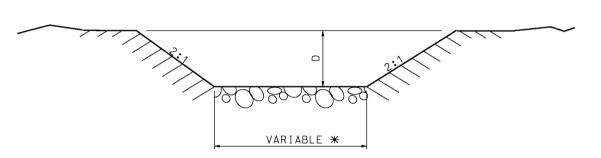
2/20/2015

806.10J





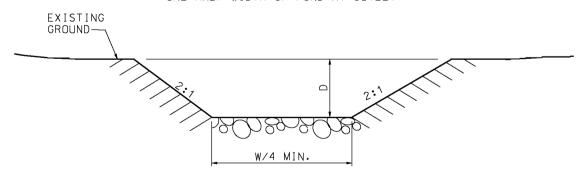
PLAN VIEW



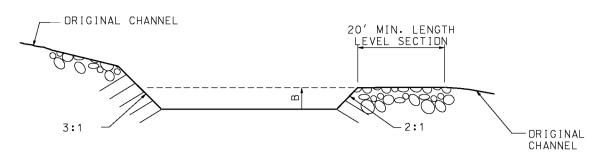
## SECTION A-A INLET

D = 1.0' + DESIGN FLOW DEPTH-MIN.

\* VARIES FROM WIDTH OF STREAM AT INLET TO ONE-HALF WIDTH OF POND AT OUTLET.

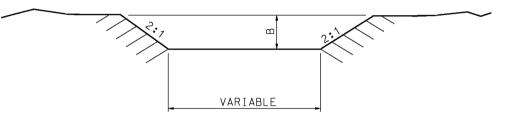


SECTION B-B OUTLET



#### SECTION C-C

EFFECTIVE DEPTH "B" = MIN. 2', MAX. 6' DEPENDENT UPON CONFIGURATION REQUIRED BY LOCATION AND ESTIMATED VOLUME.



#### SECTION D-D

LAYER OF APPROVED STABILIZING MATERIAL FOR SCOUR PREVENTION

GENERAL NOTES:

SEDIMENT BASINS ARE TO BE INCLUDED IN THE BMP SYSTEM WHEN THE GEOMETRY OF RIGHT-OF-WAY ALLOWS. WHERE INCLUDED, SEDIMENT BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE STORAGE VOLUME FOR THE LOCAL 2-YR, 24-HOUR STORM FOR DISTURBED ACREAGE DRAINING TO THEM. IF THE DESIGN STORM VOLUME HAS NOT BEEN CALCULATED, BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE A STORAGE VOLUME OF AT LEAST 3,600 CUBIC FEET PER DISTURBED ACRE DRAINING TO THE BASIN(S).

IF SEDIMENT BASIN IS TO BE PERMANENT ITS SLOPES SHALL BE STABILIZED WITH ROCK RIPRAP OR EQUIVALENT.

THE MATERIALS FOR ROCK RIPRAP SHALL MEET THE RE-QUIREMENTS OF SEC 611.30 FOR TYPE 2 ROCK BLANKET.

SEE PLANS FOR LENGTH, DEPTH AND WIDTH OF BASIN.

SEE PLANS FOR ESTIMATED QUANTITIES OF ROCK RIPRAP -CUBIC YARDS.



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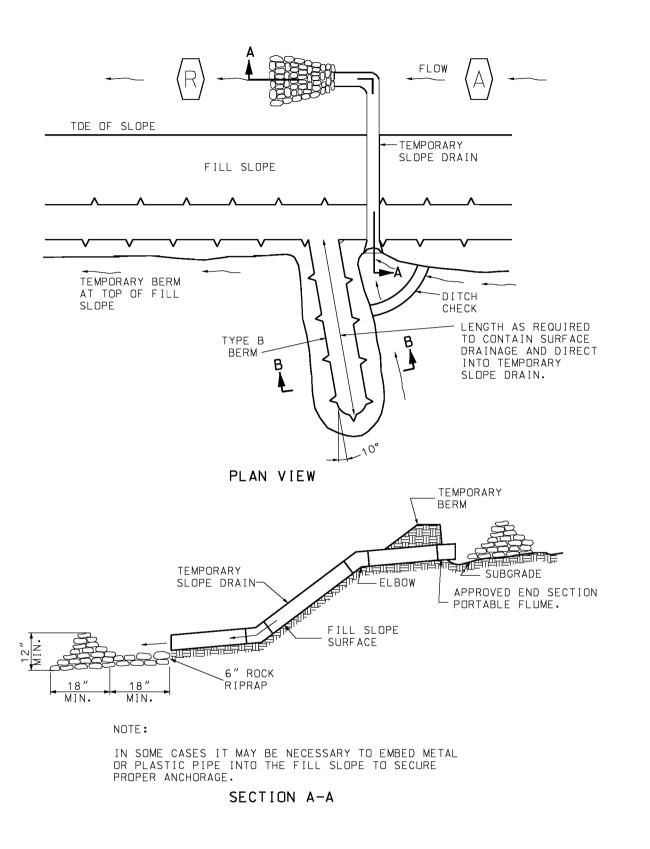
## TEMPORARY EROSION CONTROL MEASURES

SEDIMENT BASIN

DATE EFFECTIVE: 04/01/2015 DATE PREPARED:

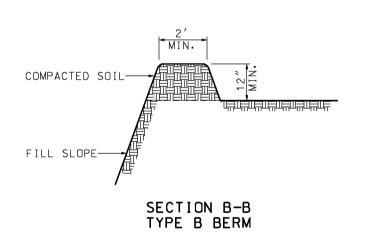
2/20/2015

806.10J



## SHORT SECTION PIPE APPROVED END SECTION \_ELBOW FLOW. -DOWNDRAIN FILL SLOPE SURFACE -PLAN VIEW SECTION VIEW

## TEMPORARY SLOPE DRAIN INLET TREATMENT







TEMPORARY EROSION CONTROL MEASURES

SLOPE DRAINS

DATE EFFECTIVE: 04/01/2015 DATE PREPARED:

2/20/2015

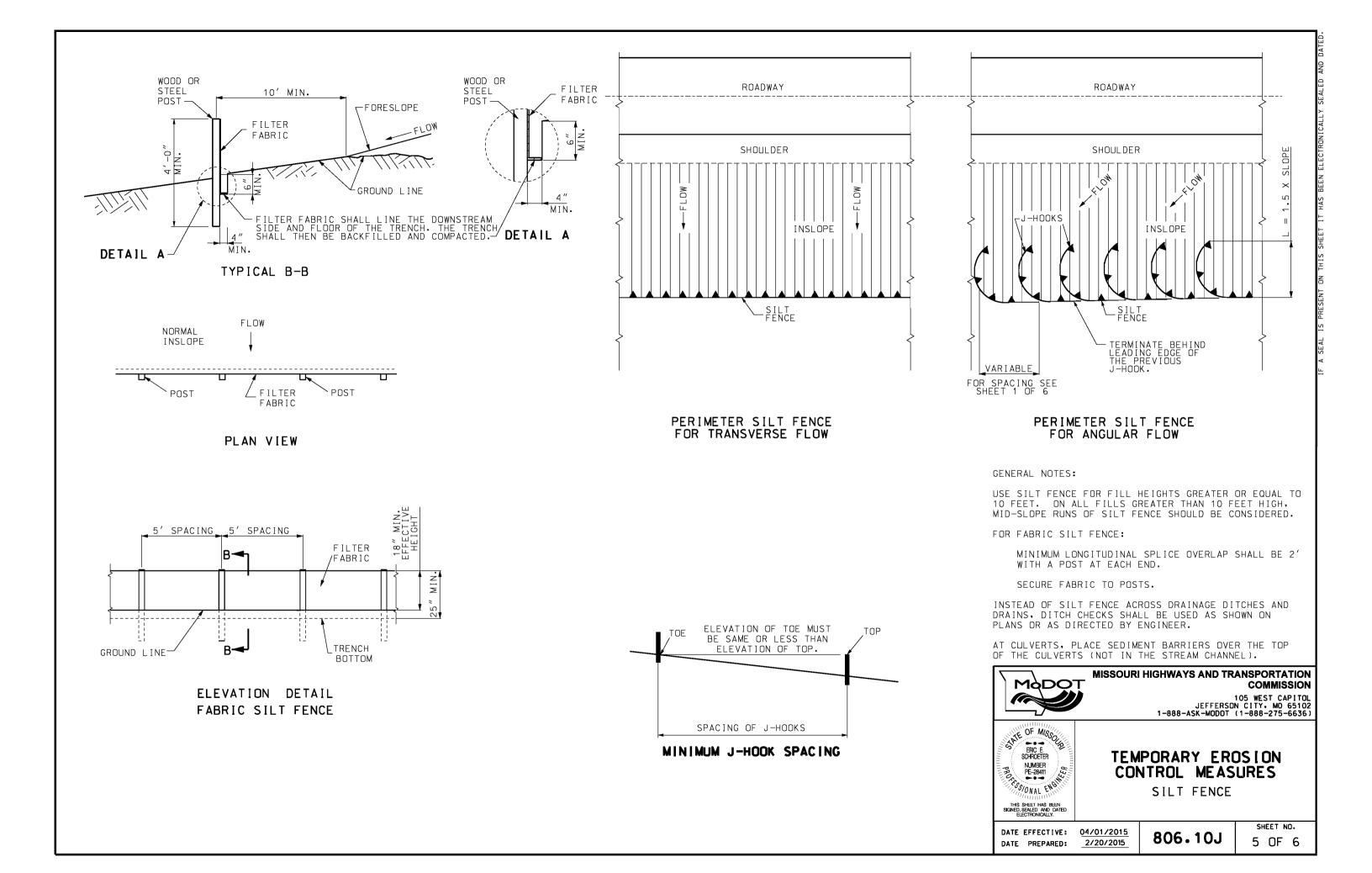
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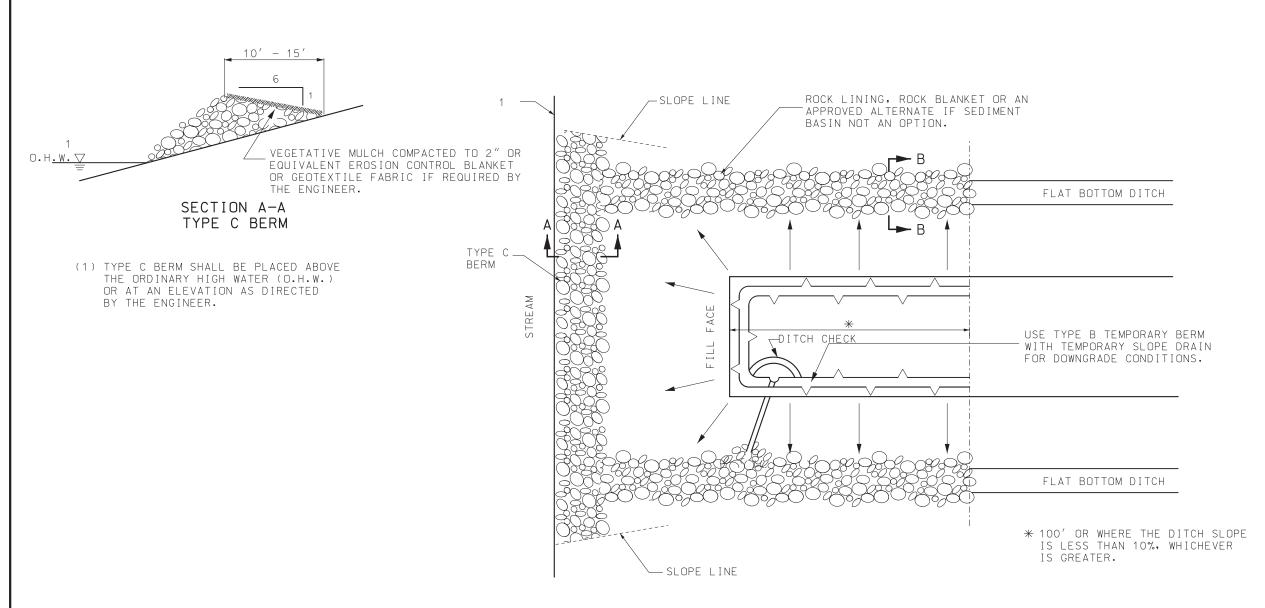
SHEET NO. 4 OF 6

## TEMPORARY BERM

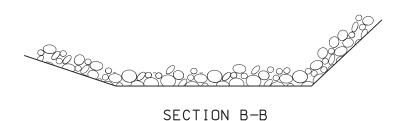
(METAL, FLEXIBLE RUBBER OR PLASTIC PIPE)

MAXIMUM LENGTH BETWEEN SLOPE DRAINS SHALL BE APPROXIMATELY 500 FEET.





PLAN VIEW



#### GENERAL NOTES:

TYPE C BERM SHALL BE BUILT TO HANDLE SIGNIFICANT RUN-OFF EVENTS AND SHALL BE INSTALLED PRIOR TO SOIL DISTURBANCE OR PLACEMENT OF FILL IN THE DRAINAGE AREA OF THE BERM.



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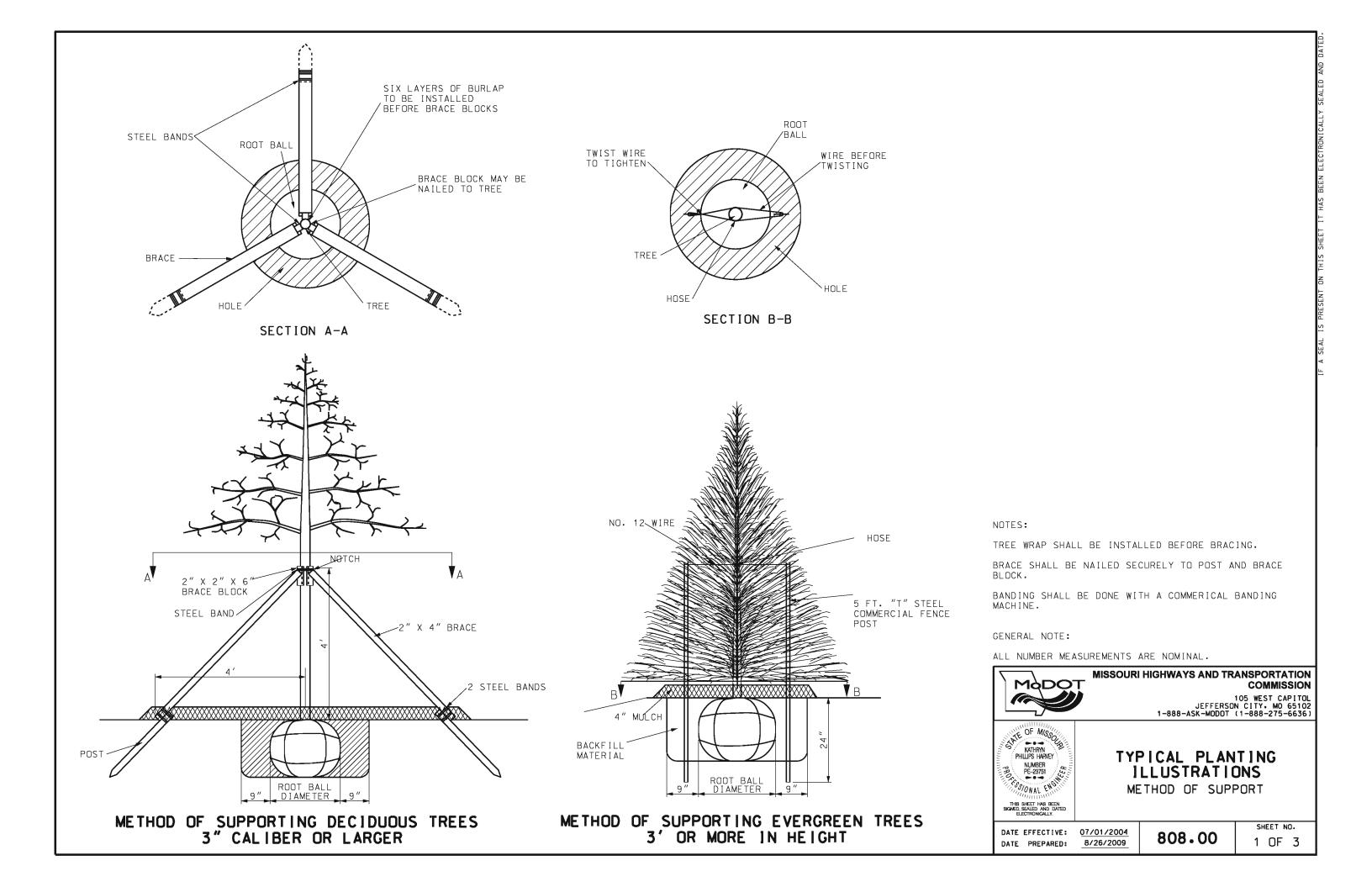


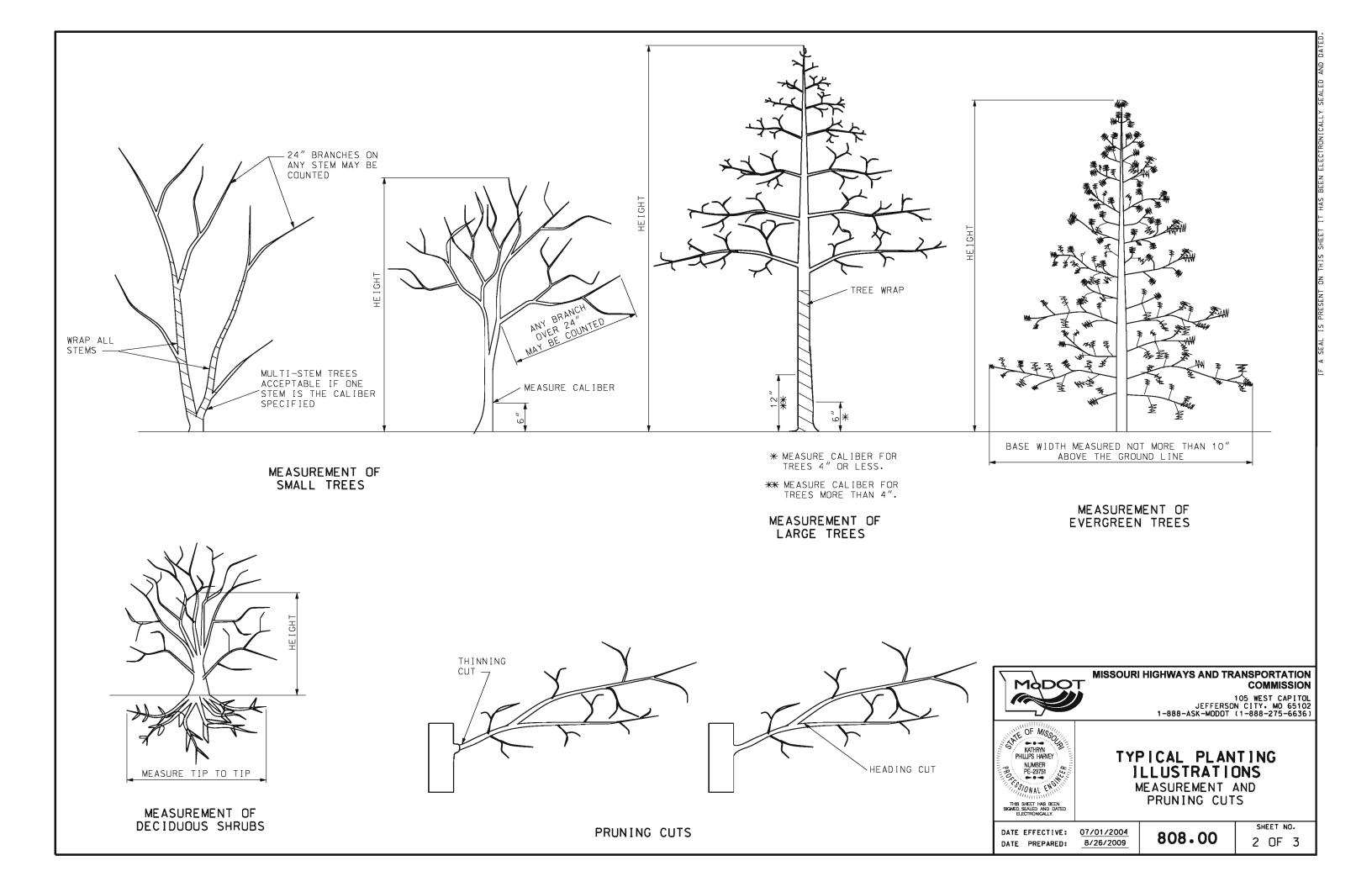
## TEMPORARY EROSION CONTROL MEASURES

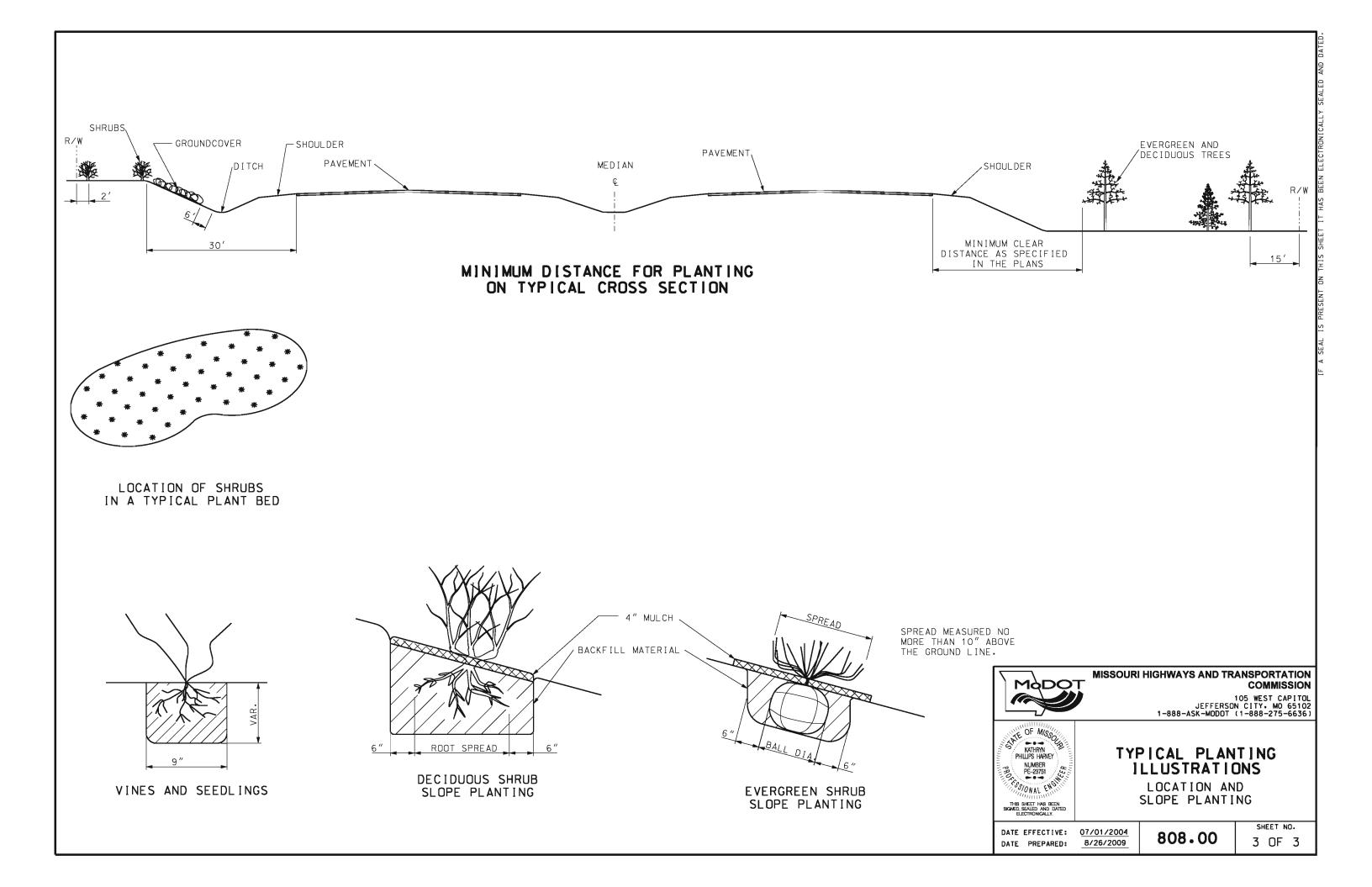
BRIDGES AND BOX CULVERTS AT STREAM CROSSINGS

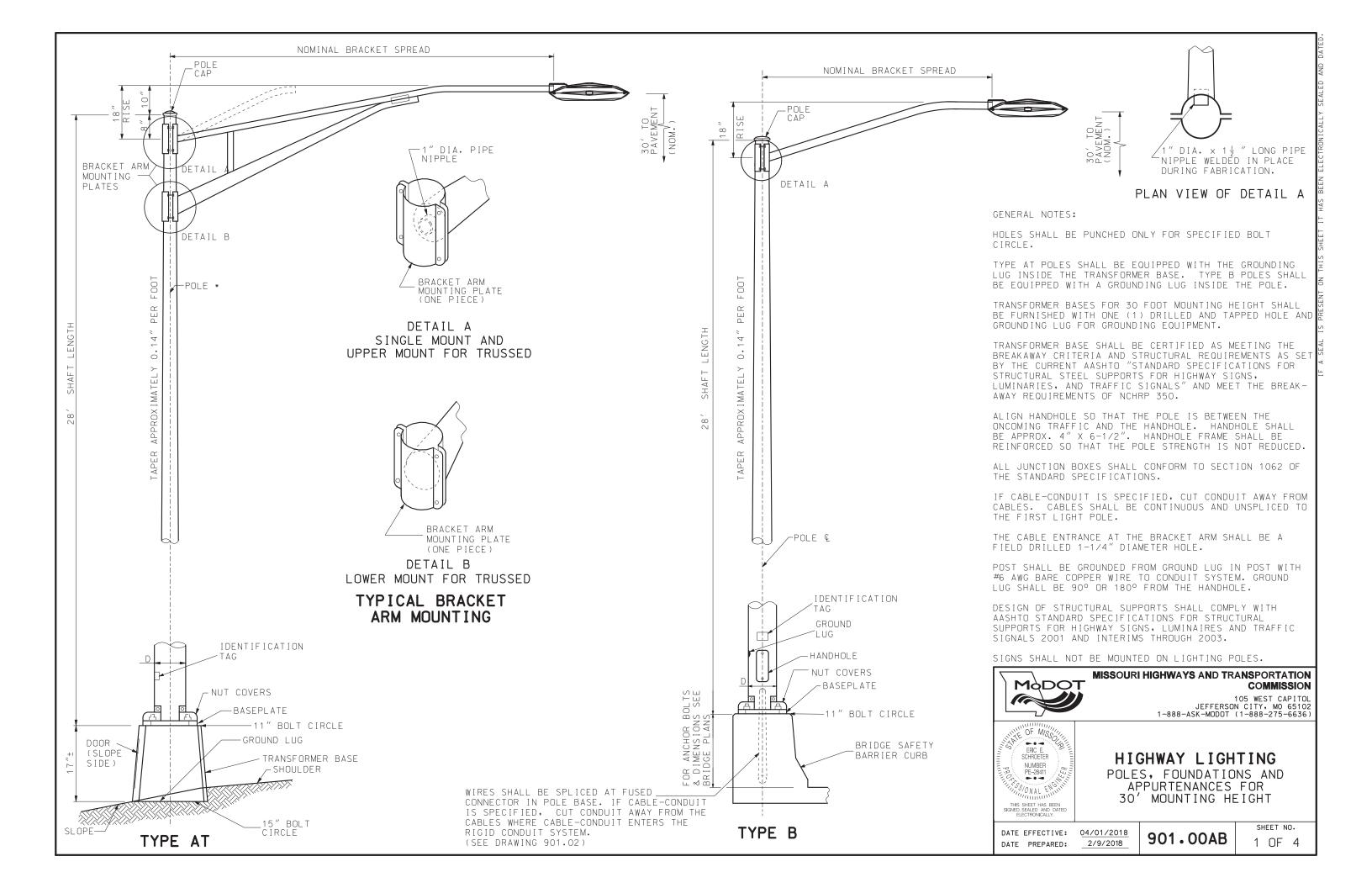
SHEET NO. 6 OF 6

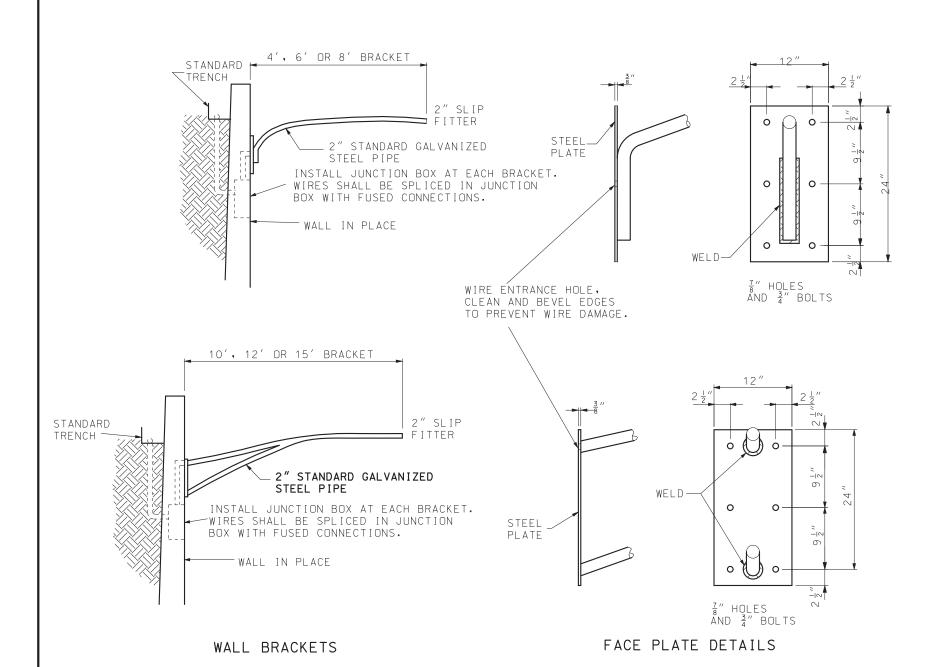
DATE EFFECTIVE: 04/01/2019 806.10J DATE PREPARED: 1/16/2019







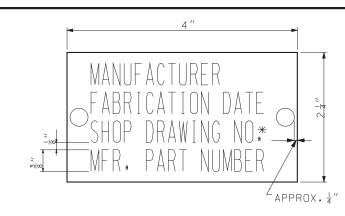




		LED LU	MINAIRES	
FUSE RATING	DESIGNATION	MAX. WATT	DISTRIBUTION TYPE	BACKLIGHT-UPLIGHT-GLARE (BUG) RATING
3 A	LED-A	103	III	B2-U0-G2
LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED				

	TYPE AT POLE					
BRACKET	SPREAD			4'-10'	12′	15′
MAX. LU	IMINAIRE	WEIGHT		75 LB	71 LE	3 66 LB
MAX. PR	MAX. PROJECTED AREA 3.3 SQ. FT.					FT.
	SINGLE AND TRUSSED BRACKET ARMS					
LOCATION	LENGTH POLE	BRACKET SPREAD		RANS. E BOLT CI		D
SHOULDER	28′	4′,6′,8′, 10′,12′,15′		15″		8 "

	TY	PE B POLE	<u>-</u>			
BRACKET SPRE	AD		4 ′	6′	8 ′	
MAX. LUMINAI	RE WEIGH	ΙΤ	75 LB	75 LB	54 LB	
MAX. PROJECT	MAX. PROJECTED AREA			3.3 SQ. FT.		
	SINGLE BRACKET ,					
LOCATION	LENGTH POLE	BRACKET SPREAD	D		R BOLT	
BRIDGE SAFETY BARRIER CURB	28′	4′ <b>,</b> 6′ 8′	8 "		1 "	



ID TAG NOTE:

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS.

\* INCLUDING REVISION

### IDENTIFICATION TAG

GENERAL NOTES:

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAK-AWAY REQUIREMENTS OF NCHRP 350.

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO THE FIRST LIGHT POLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.

ID TAG HOLES SHALL BE DRILLED INTO POLE PRIOR TO GALVANIZING.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

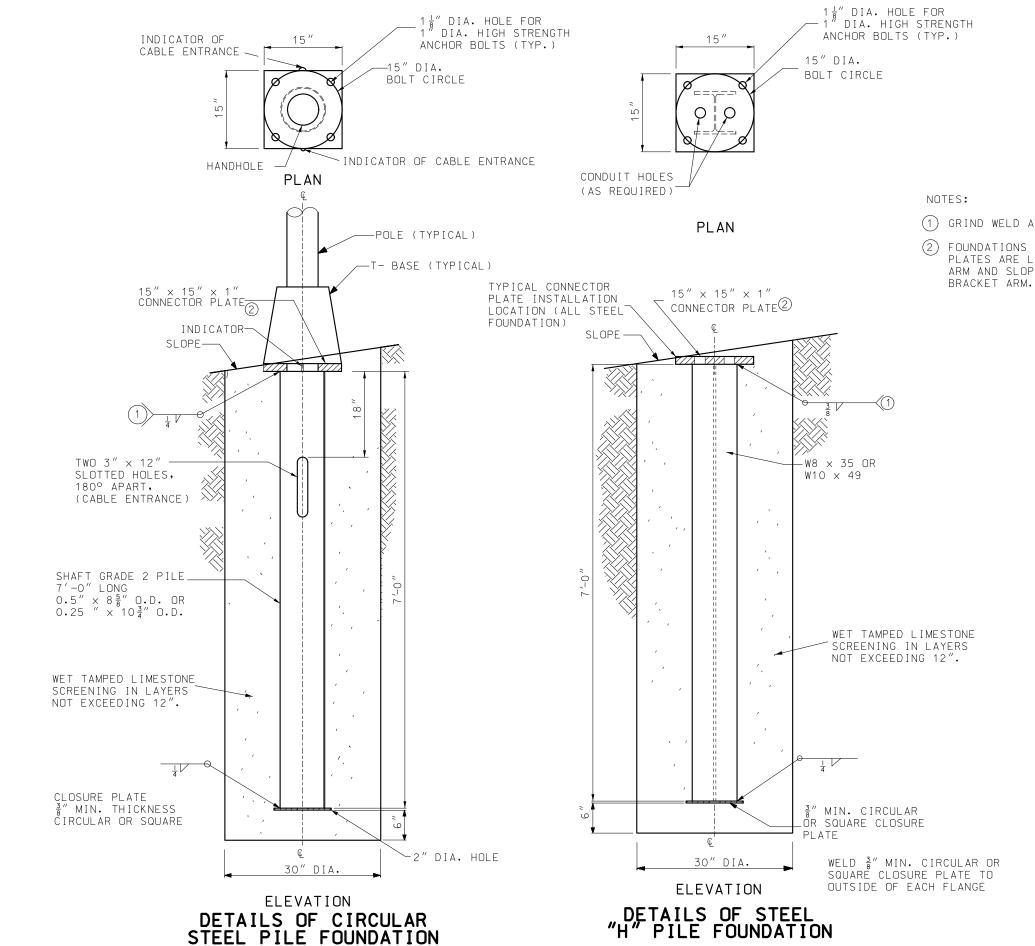


### HIGHWAY LIGHTING

POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018

901.00AB



- (1) GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE

#### GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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### HIGHWAY LIGHTING

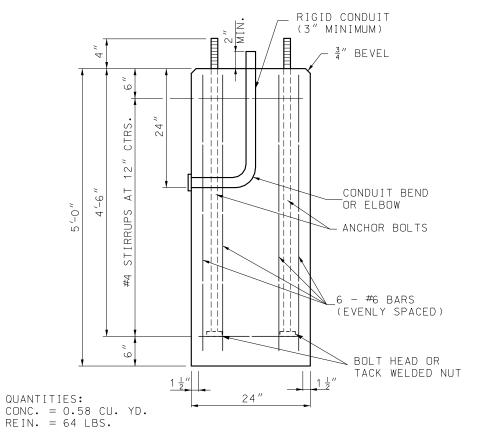
POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

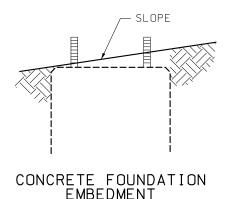
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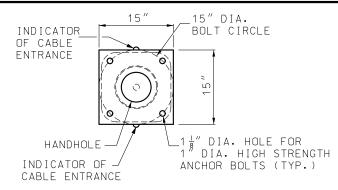
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PLAN

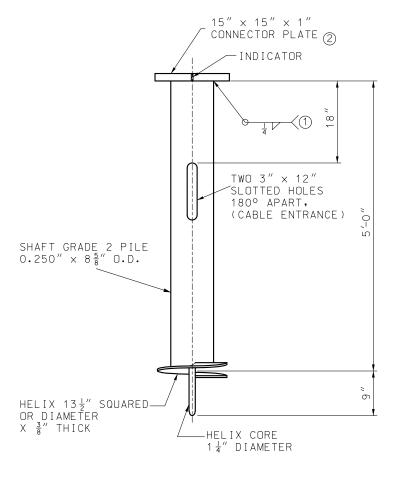


### ELEVATION DETAILS OF CONCRETE FOUNDATION (3)



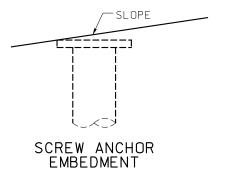


PLAN



### ELEVATION

### DETAILS OF SCREW ANCHOR FOUNDATION



DRIVE HOLES WILL BE PERMITTED PROVIDED THAT THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.

#### NOTES:

- (1) GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- 2) FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- (3) AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATION MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.

### GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### HIGHWAY LIGHTING

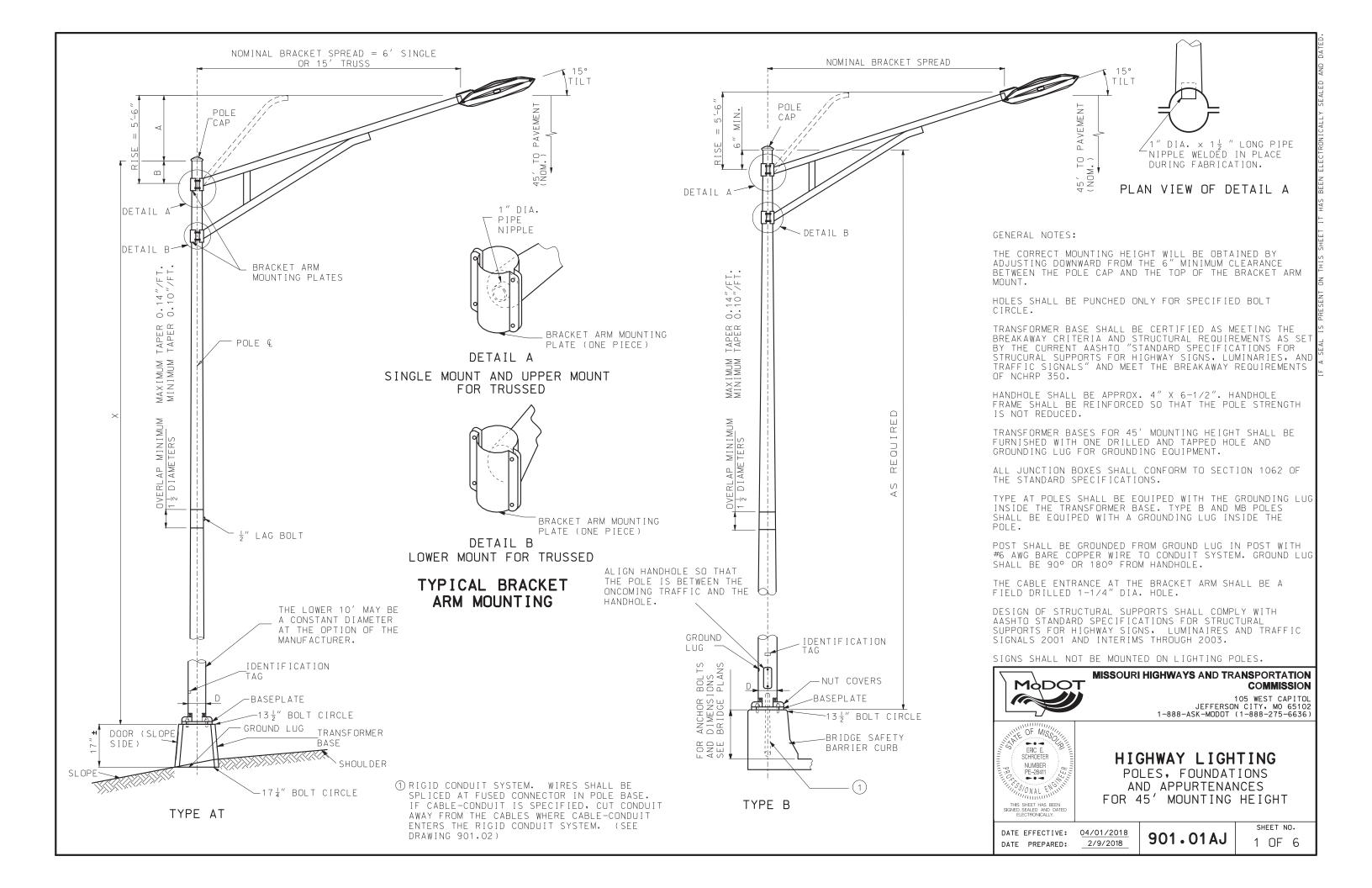
POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT

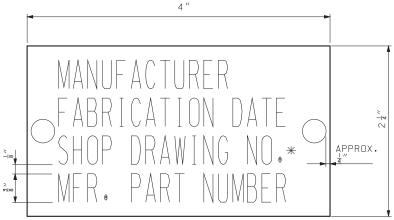
DATE PREPARED:

10/14/2020

SHEET NO. 4 OF 4

DATE EFFECTIVE: 01/01/2021 901.00AB





### IDENTIFICATION TAG

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS. ID TAG HOLES SHALL BE DRILLED PRIOR TO GALVANIZING. GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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## HIGHWAY LIGHTING

POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT

DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018

901.01AJ

	TYPE AT POLE				
BRACKET	SPREAD			6' OR 15'	
MAX. LL	JMINAIRE WE	EIGHT		60 LB	
MAX. PR	OJECTED AF	REA		3.3 SQ. FT.	
AT-45 DESIGN NO.	X	А	В	X D (NOMINAL)	
1	50′	VAR.	6" MIN.	10"	
2	45′	VAR.	6" MIN.	10"	
3	40′	VAR.	6" MIN.	10"	
4	35′	VAR.	6" MIN.	10"	
5	30′	VAR.	6" MIN.	10"	

		LED LU	MINAIRES	
FUSE RATING	DESIGNATION	MAX. WATT	DISTRIBUTION TYPE	BACKLIGHT-UPLIGHT-GLARE (BUG) RATING
3 A	LED-A	103	III	B2-U0-G2
5 A	LED-B	170	III	B3-U0-G3
7 A	LED-C	275	III	B3-U0-G3
	LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED			

ON PLANS.

\* THE MINIMUM ALTERNATE DIAMETER SHALL BE 10" FOR A 50' POLE, 9-1/2" FOR A 45' POLE, 9" FOR A 40' POLE, 8-1/2" FOR A 35' POLE AND 8" FOR A 30' POLE.

TYPE B POLE					
BRACKET SPREAD		6′	OR 15′		
MAX. LUMINAIRE V	VE I GHT		60 LB		
MAX, PROJECTED A	REA	3	.3 SQ. FT.		
	SINGLE BRACKET ARM	1			
LOCATION	BRACKET SPREAD	D NOM.	ANCHOR BOLT DIA.		
BRIDGE SAFETY BARRIER CURB	6′	10″	1-1/4"		
	TRUSSED BRACKET ARI	M			
LOCATION	BRACKET SPREAD	D NOM.	ANCHOR BOLT DIA.		
BRIDGE SAFETY BARRIER CURB	15′	10"	1-1/4"		

TYPE MB POLE				
BRACKET SPREAD		6′ (	DR 15'	
MAX. LUMINAIRE V	/E I GHT	60	LB	
MAX, PROJECTED A	REA	3.3 9	SQ. FT.	
	DOUBLE BRACKET ARM			
LOCATION	BRACKET SPF	READ	D NOM.	
MEDIAN BARRIER CURB	6′		10"	
DOU	BLE TRUSSED BRACKE	T ARM		
LOCATION BRACKET SPREAD D NOM.				
MEDIAN BARRIER CURB	15′		10"	

GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6½". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1 4" DIA. HOLE.



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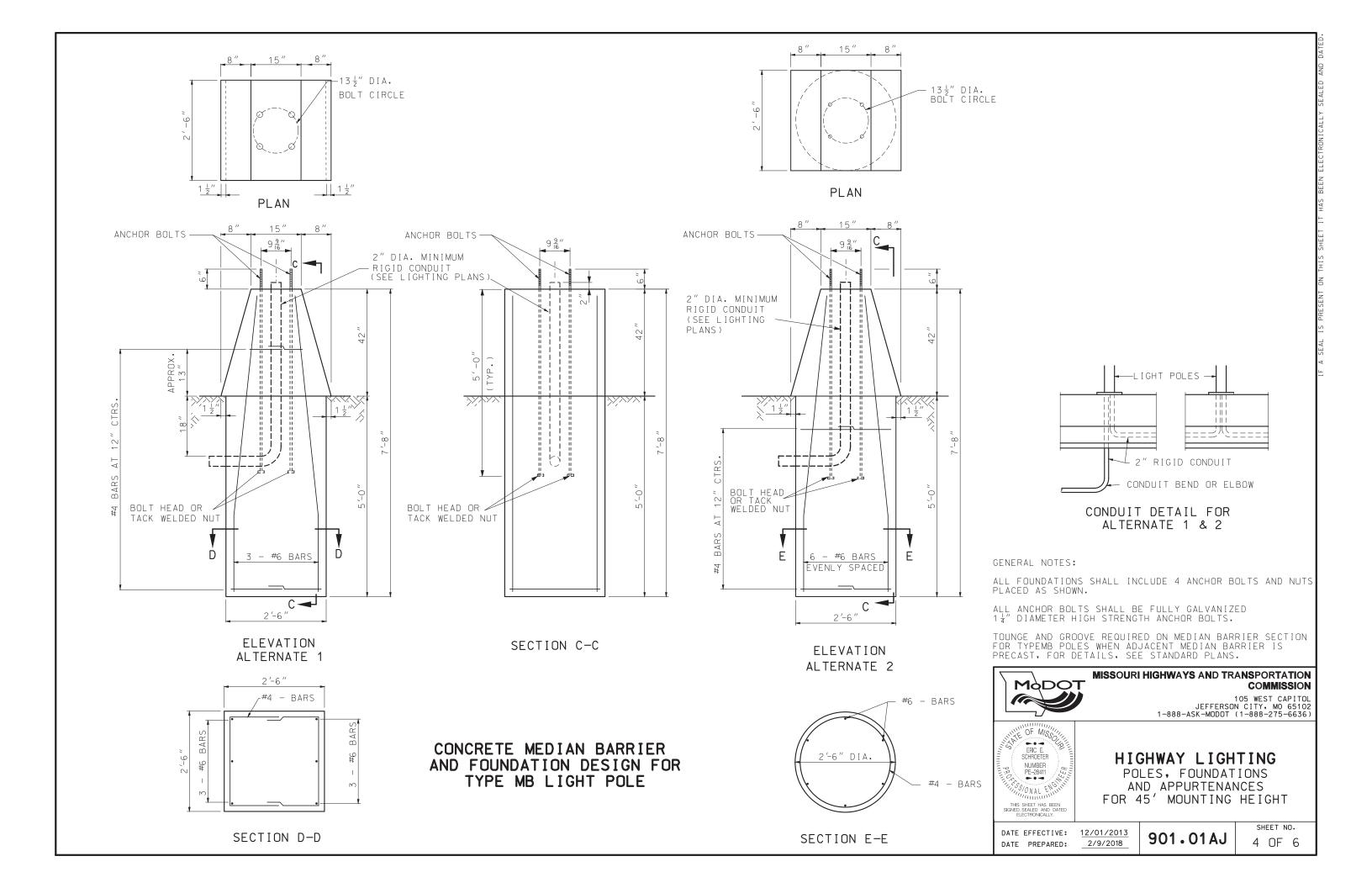


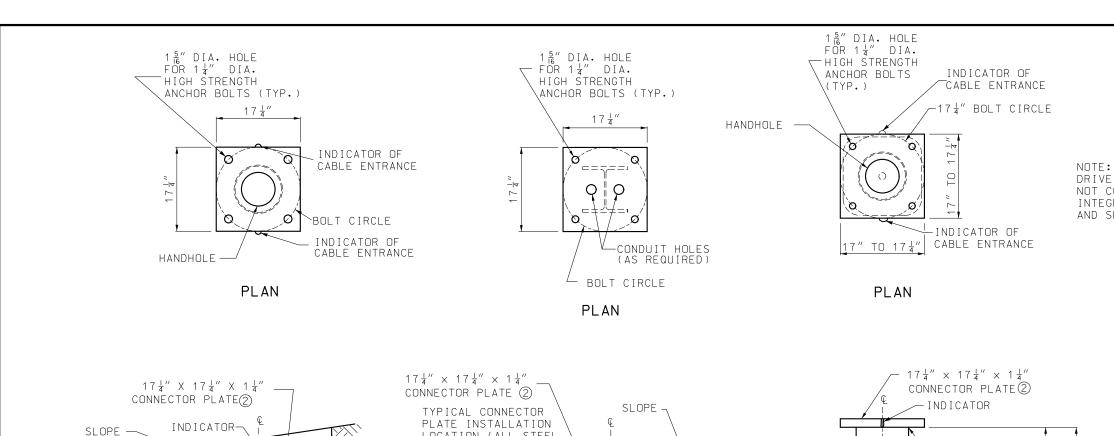
### HIGHWAY LIGHTING

POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT

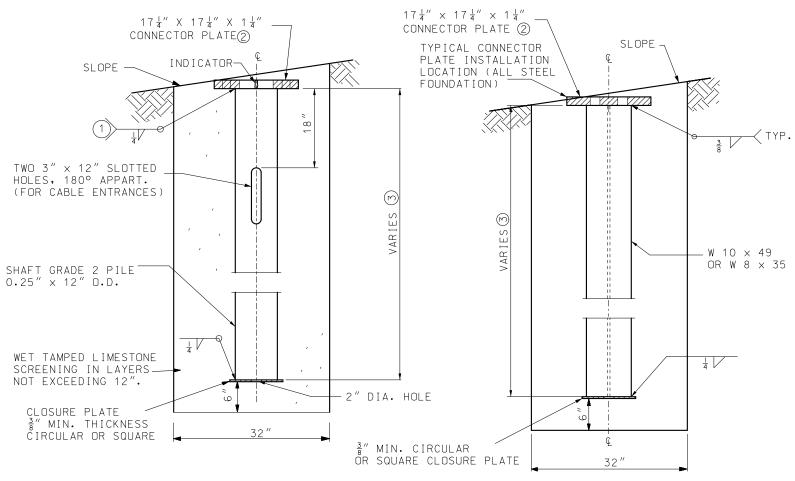
DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018

901.01AJ





DRIVE HOLES WILL BE PERMITTED PROVIDED THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.



ELEVATION DETAILS OF CIRCULAR STEEL PILE FOUNDATION

ELEVATION DETAILS OF STEEL "H" PILE FOUNDATION

TWO 3"  $\times$  12" SLOTTED HOLES, 180° APPART. (FOR CABLE ENTRANCES)  $\sqrt{\frac{\text{GRADE 2 PILE}}{0.250'' \times 10\frac{3}{4}''}}$ — HELIX CORE 1¼" DIA. HELIX 15" SQUARED OR DIA. x ½" THICK

ELEVATION DETAILS OF SCREW ANCHOR FOUNDATION

- (1) GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- (3) PILE LENGTHS FOR STEEL PILE FOUNDATIONS:

AT-45 DESIGN NO. PILE LENGTH

### GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE  $17\frac{1}{4}''$ .

ALL CONECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

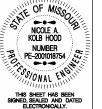
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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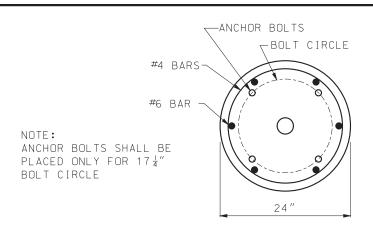


### HIGHWAY LIGHTING

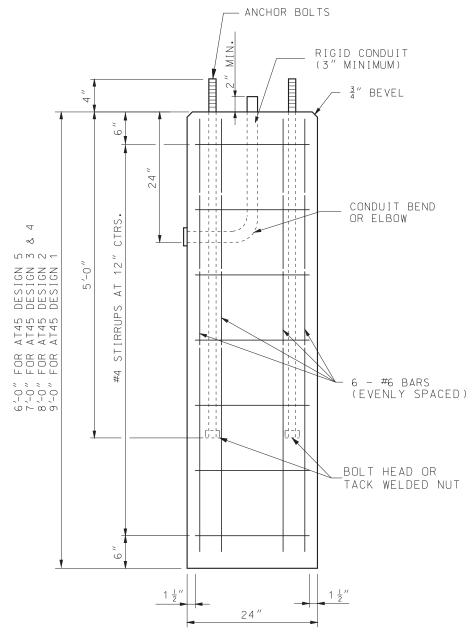
POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

901.01AJ

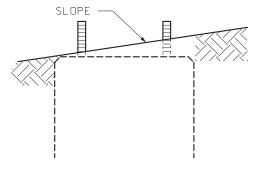


### PLAN



(4) AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATIONS MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.

QUANTITIES				
	CONC.	REINF.		
HEIGHT	CU. YD.	LBS.		
6′-0″	.70	80		
7′-0″	.81	90		
8′-0″	.93	104		
9′-0″	1.05	120		



CONCRETE FOUNDATION **EMBEDMENT** 

ELEVATION

DETAILS OF CONCRETE FOUNDATION (4)

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE

ALL CONECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



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### HIGHWAY LIGHTING

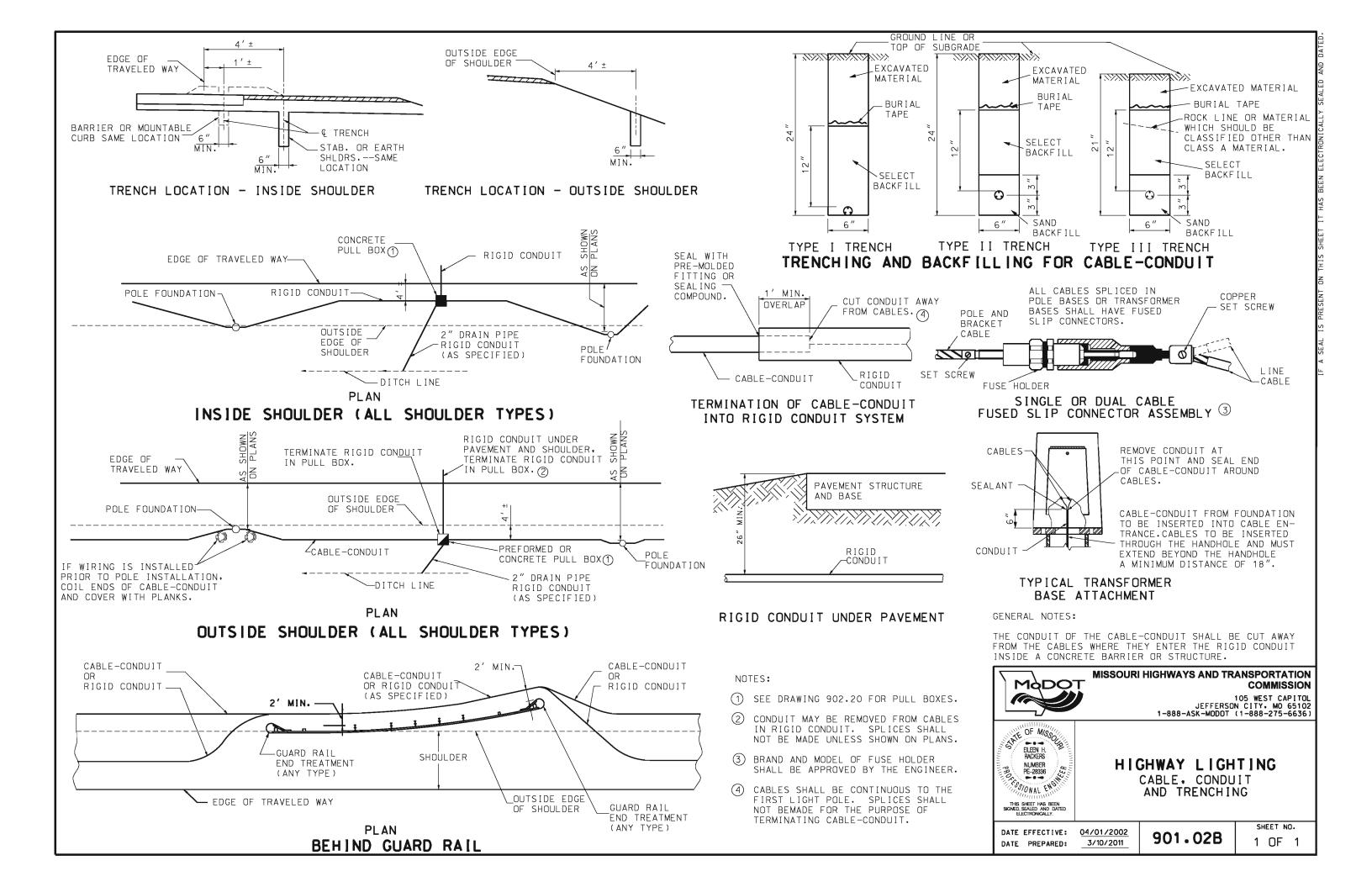
POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT

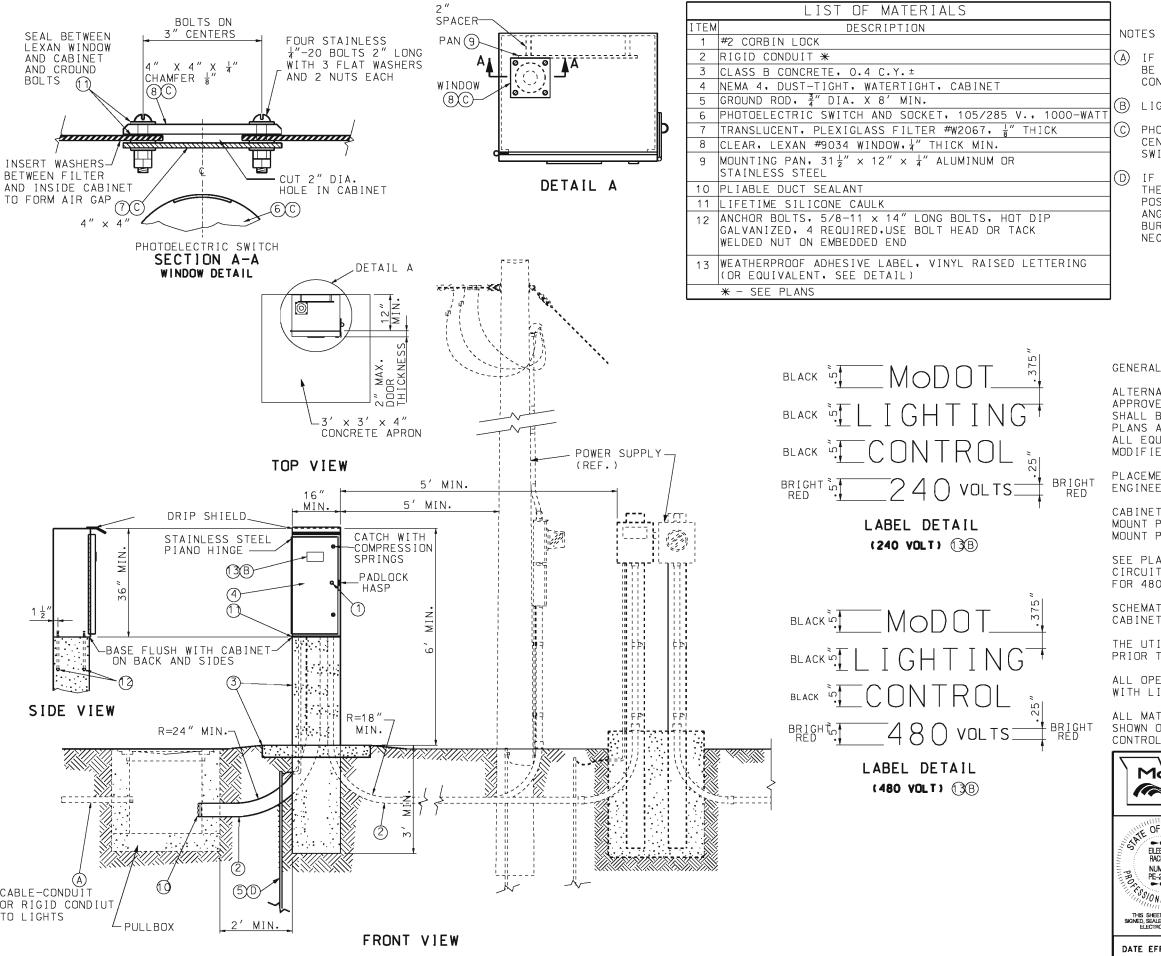
DATE EFFECTIVE: 12/01/2013 DATE PREPARED: 2/9/2018

901.01AJ

SHEET NO.

6 OF 6





- IF CABLE-CONDUIT IS SPECIFIED, THE CONDUIT SHALL BE CUT AWAY FROM CABINET BETWEEN PULL BOX AND CONTROL STATION.
- LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.
- PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WIDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CON-NECTION TO GROUND ROD SHALL BE CADWELDED.

GENERAL NOTES:

ALTERNATE CABINET DIMENSIONS WILL BE ALLOWED AS APPROVED BY THE ENGINEER. INTERIOR CABINET VOLUME SHALL BE EQUAL TO OR GREATER THAN THAT SHOWN ON PLANS AND PROPER CLEARANCES SHALL BE PROVIDED FOR ALL EQUIPMENT, CONCRETE BASE DIMENSIONS SHALL BE MODIFIED TO FIT THE CABINET SUPPLIER.

PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.

CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE MOUNT PHOTO CONTROL SHALL FACE NORTH.

SEE PLANS FOR CIRCUIT WIRING; MAXIMUM LOADING PER CIRCUIT IS 7,400 WATTS FOR 240 VOLT AND 11,000 WATTS FOR 480 VOLT.

SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.

THE UTILITY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR CONTROL STATION.



#### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

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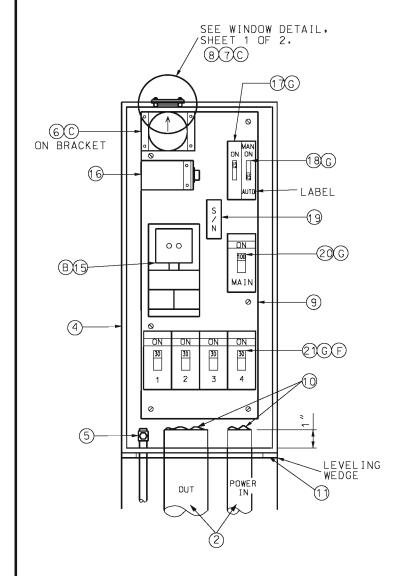


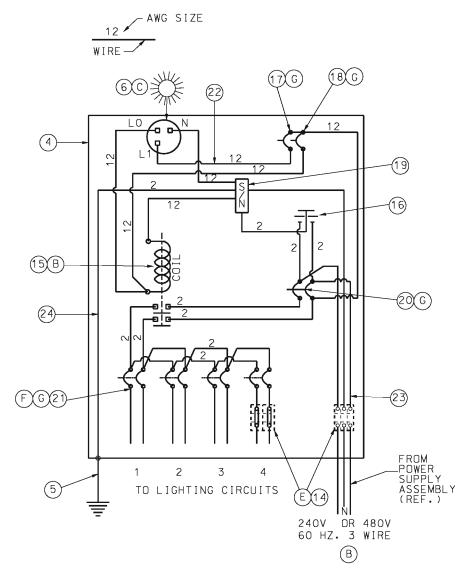
# HIGHWAY LIGHTING

BASE MOUNTED CONTROL STATION 240 V OR 480 V - 4 CIRCUIT

DATE EFFECTIVE: 04/01/2005 DATE PREPARED:

901.30F





WIRING DIAGRAM

	LIST OF MATERIALS	딭
ITEM	DESCRIPTION	AND DATED
2	RIGID CONDUIT *	ON O
4	NEMA 4, DUST-TIGHT, WATERTIGHT CABINET	
5	GROUND ROD, 3/4" DIA, X 8' MIN.	SF AI FD
6	PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT	
7	TRANSLUCENT, PLEXIGLASS FILTER #W2067, \frac{1}{8}" THICK	
8	CLEAR, LEXAN #9034 WINDOW, 4" THICK MIN.	> - V - V - V - V - V - V - V - V - V -
9	MOUNTING PAN, 31½" x 12" x ¼" ALUMINUM OR STAINLESS STEEL	I
10	PLIABLE SEALANT	
11	LIFETIME SILICONE CAULK	
14	INSULATED TERMINAL BLOCK, FOR GREATER THAN 4/0 CABLE	
15(240V)	2-POLE, 100 AMP, 120V CDIL LIGHTING CONTACTOR	
	2-POLE, 100 AMP, 240V COIL LIGHTING CONTACTOR	=
16	2-POLE, 650 VOLT LIGHTING ARRESTER	
17	1-POLE, 15 AMP, TYPE B CONTROL BREAKER	
18	1-POLE, 15 AMP, TYPE B MANUAL-AUTO SWITCH	
19	INSULATED GROUNDABLE NEUTRAL, 100 AMP	Y
20	2-POLE, 100 AMP, TYPE A MAIN BREAKER	
21	2-POLE, 15 AMP(MIN), TYPE A LIGHTING BREAKERS	
22	#12 AWG MIN., 600 V. CONTROL CABLE	7 7 7
23	#2 AWG MIN., 600 V. * POWER CABLE	TO PRECENT
24	#2 AWG MIN., 600 V. GROUND CABLE	
*	SEE PLANS	ZE ∆I

### NOTES

- (B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.
- PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- IF FOR REASONS OF VOLTAGE DROP A WIRE SIZE IS SPECIFIED LARGER THAN THE BREAKER LUGS CAN ACCOMMODATE, AN INSULATED HEAVY DUTY TERMINAL BLOCK SHALL BE INSTALLED TO TERMINATE THE LARGER WIRES AND A SMALLER JUMPER CONNECTED TO THE BREAKER ITSELF.
- (F) LIGHTING BREAKER SIZING:

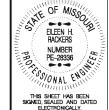
LIGHTING DREAKER	SIZING.	
	240V TOTAL	480V TOTAL
SIZE (AMPS)	CIRCUIT LOAD (WATTS)	CIRCUIT LOAD (WATTS)
15	0-2800	0 - 5500
20	2850-3700	5550 - 7400
25	3750-4600	7450 - 9200
30	4650-5500	9250 - 11,000
35	5550-6500	
40	6550-7400	
CIRCUIT LOAD	INCLUDES LOAD DUE TO LINE LOSS,	LAMP, AND BALLAST LOAD.

ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.



### **MISSOURI HIGHWAYS AND TRANSPORTATION** COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



### HIGHWAY LIGHTING

BASE MOUNTED CONTROL STATION 240 V OR 480 V - 4 CIRCUIT

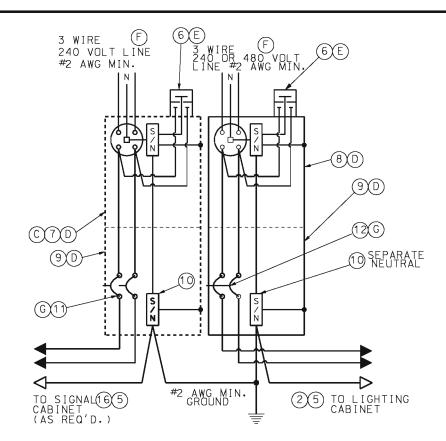
DATE EFFECTIVE: 04/01/2005 DATE PREPARED:

901.30F

SHEET NO. 2 OF 2

**EQUIPMENT LAYOUT** 

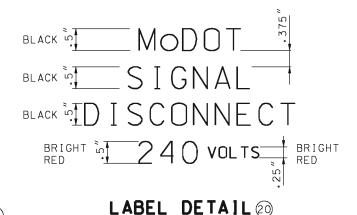
	LIST OF MATERIALS
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN., CLASS 4 WOOD, CONTRACTOR PROVIDED, MODOT OWNED*
2	#2 AWG MIN. CABLE, 600 VOLT *
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	RIGID CONDUIT, 2" MIN., WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTER, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	METER SOCKET, 200 AMP, FOR LIGHTING
9	LOCKING, RAINTIGHT, NEMA 4 SERVICE DISCONNECT BOX
10	INSULATED, GROUNDABLE NEUTRAL WIRE, 200 AMP MINIMUM
11	SIGNAL BREAKERS, SINGLE POLE, 40A MIN, TYPE A OR B *
12	LIGHTING BREAKER, 2 POLE, 240 VOLT, 100A, TYPE A OR B
13	1/2" METAL CONDUIT
14	#2 AWG MIN. GROUND WIRE
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT *
17	CLASS B CONCRETE, 0.92 C.Y.±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	WEATHERPROOF ADHESIVE LABEL (LIGHTING), VINYL RAISED LETTERING
	(OR EQUIVALENT, SEE DETAIL)
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS), VINYL RAISED LETTERING
	(OR EQUIVALENT, SEE DETAIL)
21	W6 x 9 OR W6 x 15 GALVANIZED POST
22	#2 AWG MIN. CABLE, 600 VOLT
23	RIGID CONDUIT, 2" MINIMUM
*	SEE PLANS



WIRING DIAGRAM LIGHTING AND/OR SIGNALS







#### NOTES:

- SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50 FEET.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 30 FEET.
- SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL. ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAINLESS STEEL. METER SOCKET FOR SIGNALS OR LIGHTING AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET. IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE DISCONNECT CABINET.
- LIGHTING SYSTEM VOLTAGE OF 240 VOLTS OR 480 VOLTS AS SHOWN ON THE PLANS.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION. THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

#### GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

THE POWER SUPPLY ASSEMBLY TYPE IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED. OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED AS SHOWN ON DRAWING, INCLUDING CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES, SHALL BE INCLUDED IN UNI BID PRICE FOR POWER SUPPLY ASSEMBLY.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

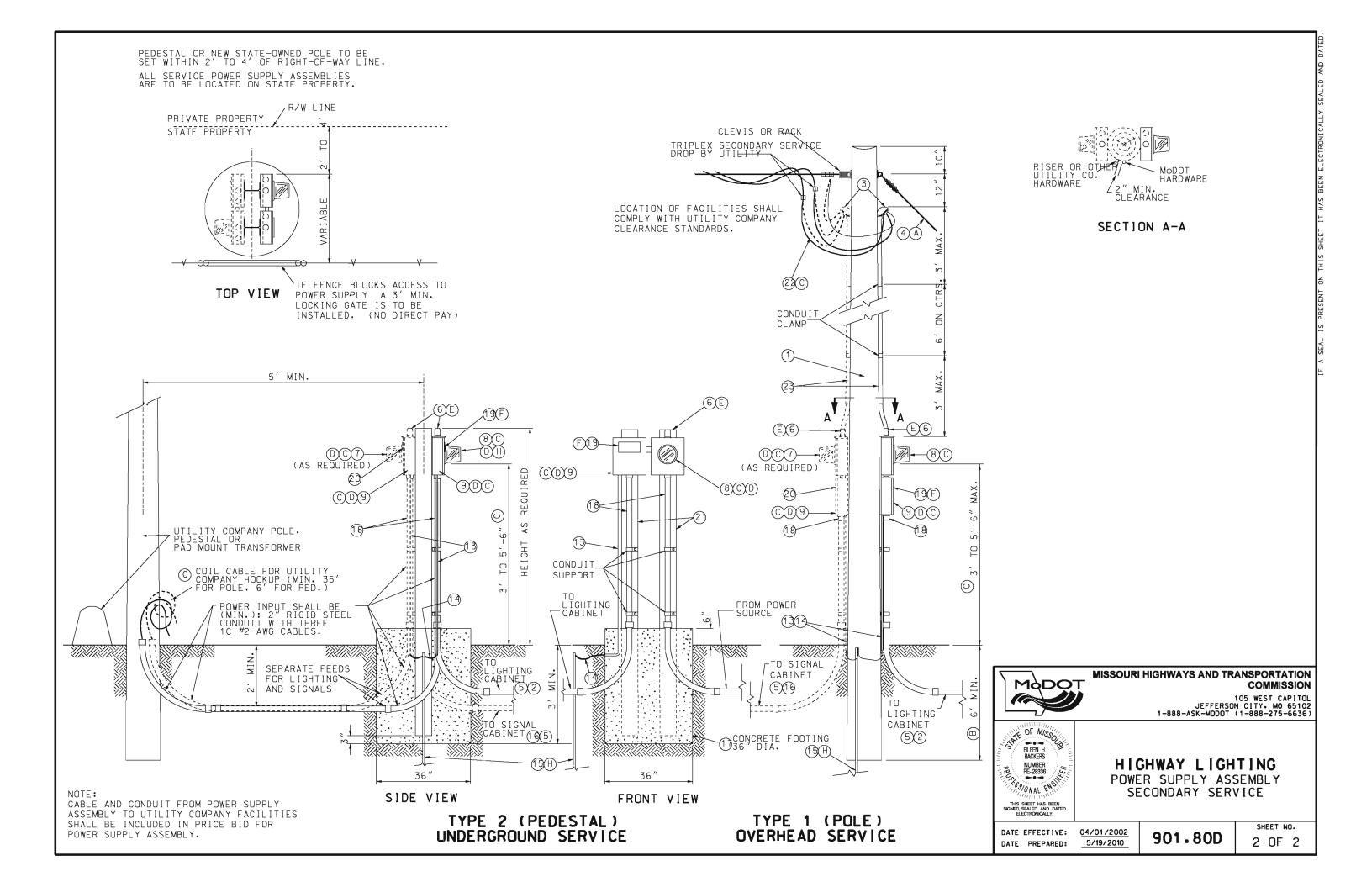
105 WEST CAPITOL JEFFERSON CITY MO 65102 1-888-ASK-MODOT (1-888-275-6636)

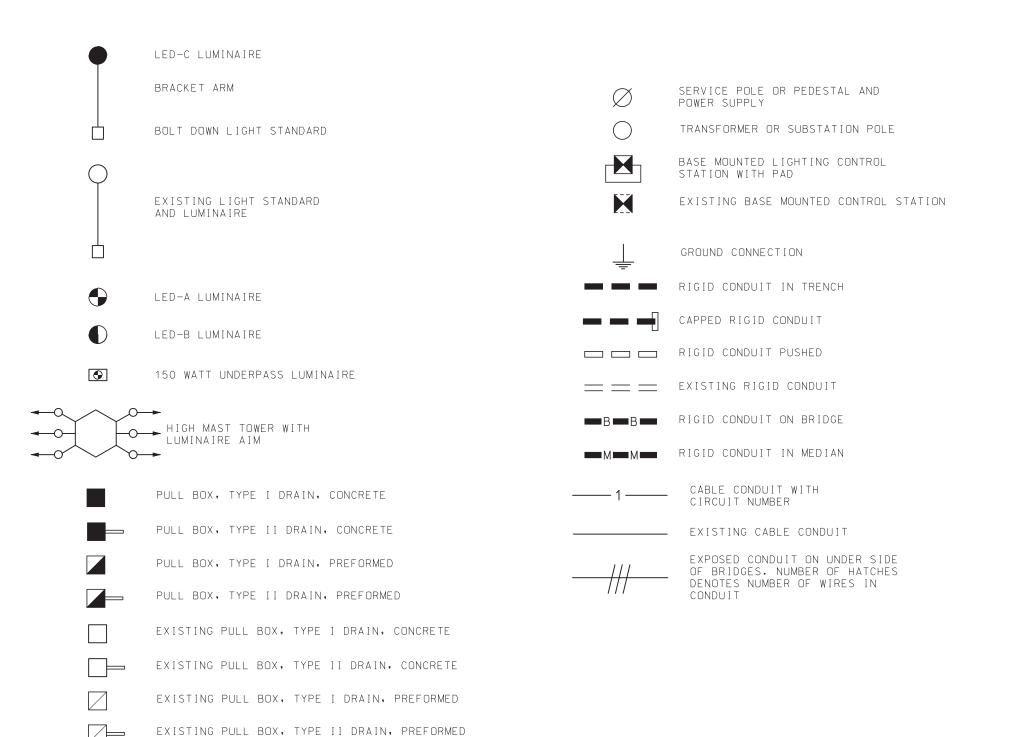


HIGHWAY LIGHTING POWER SUPPLY ASSEMBLY SECONDARY SERVICE

DATE EFFECTIVE: 04/01/2002 DATE PREPARED:

901.80D







#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

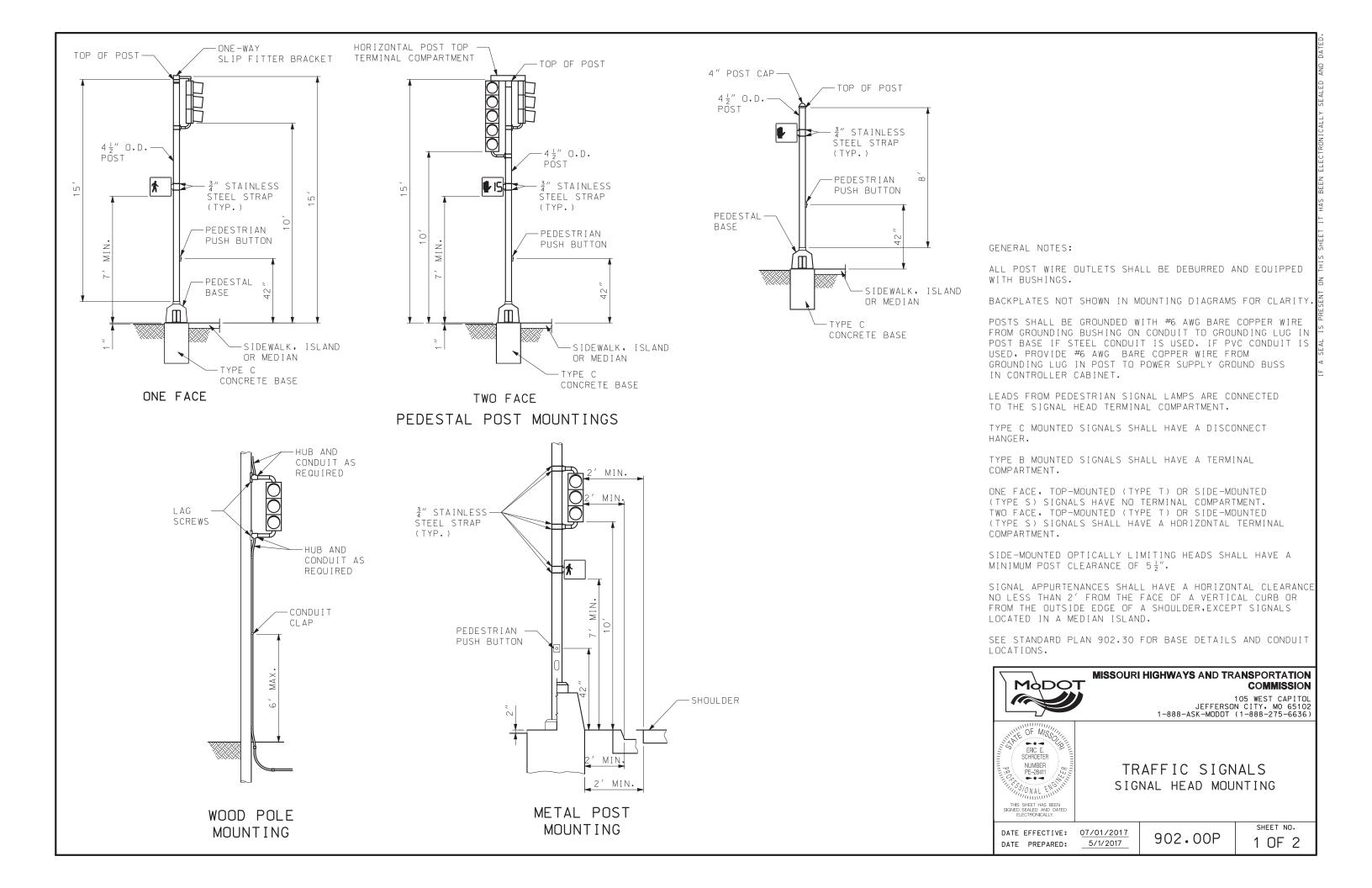
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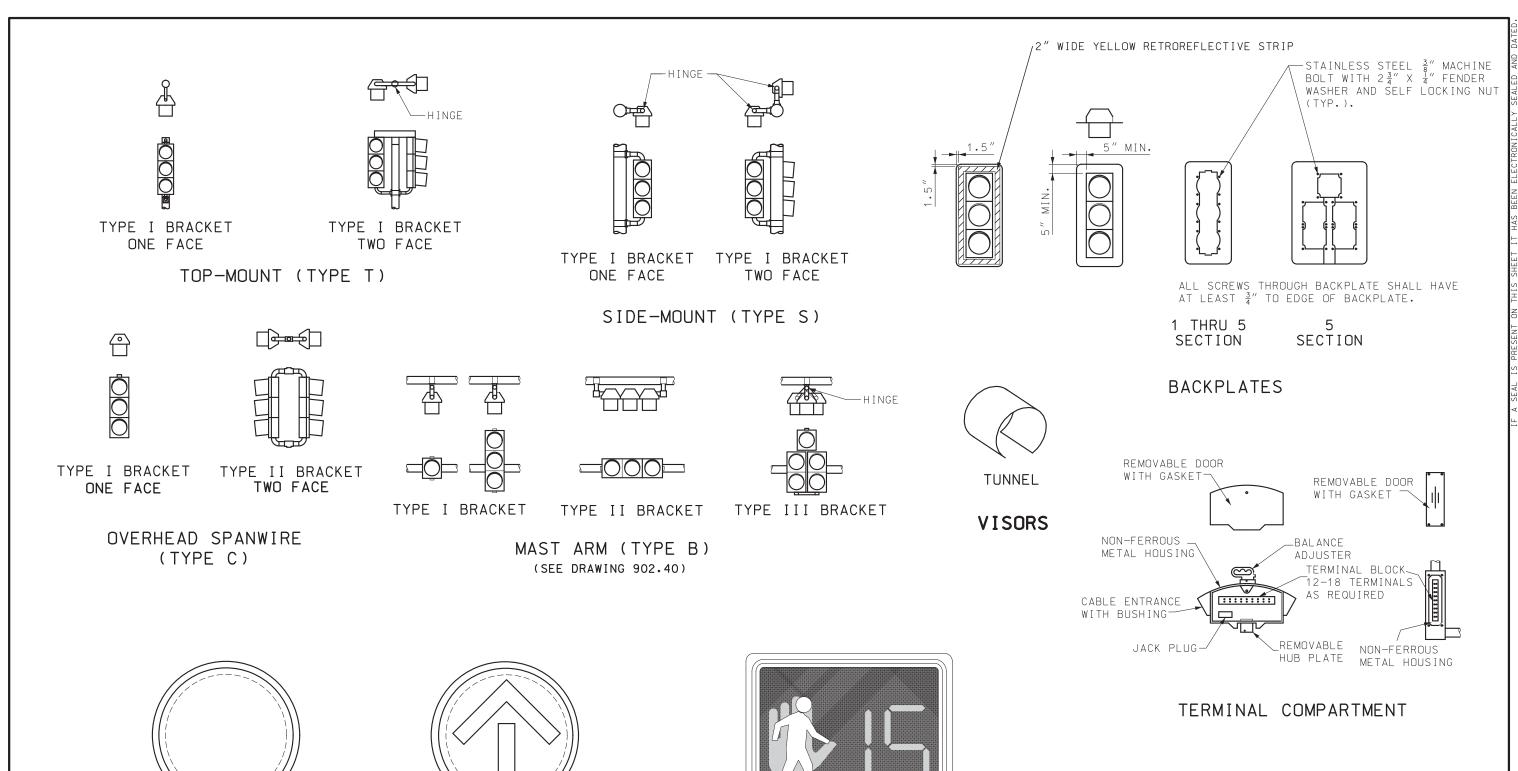


### HIGHWAY LIGHTING SYMBOLS

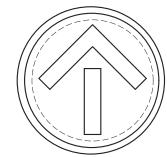
DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018

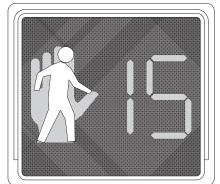
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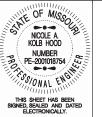


PEDESTRIAN CIRCULAR ARROW

INDICATIONS

#### MISSOURI HIGHWAYS AND TRANSPORTATION MODOT COMMISSION

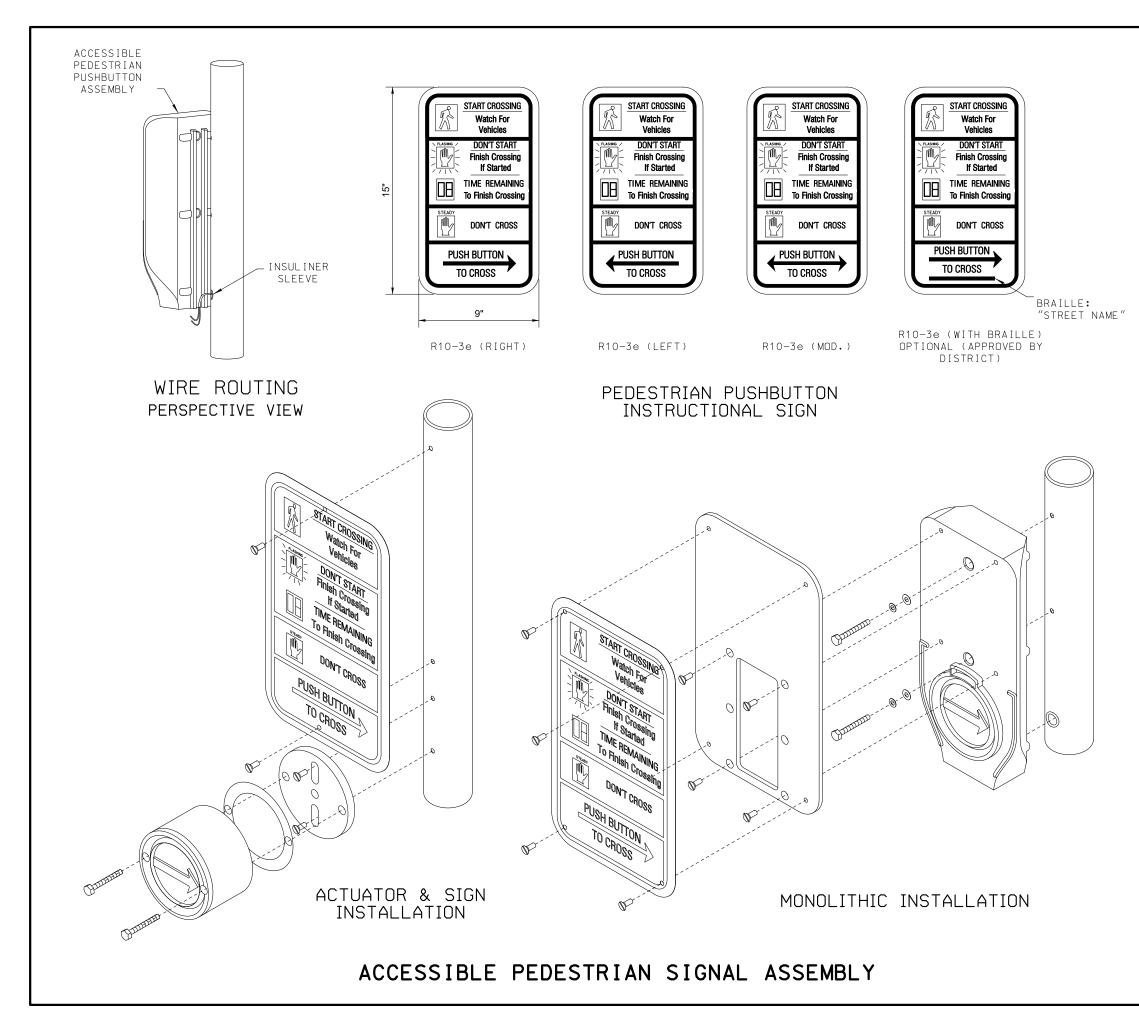
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

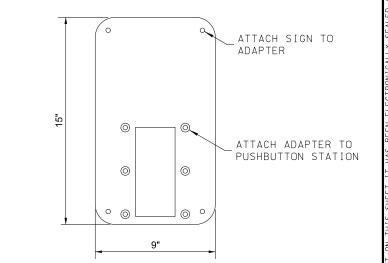


TRAFFIC SIGNALS SIGNAL HEAD LOUVERS, VISORS, BACKPLATES AND TERMINAL COMPARTMENT

DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018

902.00P





### PEDESTRIAN PUSHBUTTON FRAME ADAPTER

GENERAL NOTES:

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY MAY BE MONOLITHIC OR A SEPARATE ACTUATOR AND SIGN.

SIGNS FOR SIGNAL INSTALLATIONS, INCLUDING ALL MATERIAL REQUIRED FOR SIGN MOUNTING, SHALL BE FURNISHED BY THE CONTRACTOR, SIGNS SHALL BE MANUFACTURED IN ACCORDANCE WITH SEC 903, AND MOUNTED AS SHOWN ON THE PLANS.

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY CAN BE MOUNTED TO SIGNAL POLE, PEDESTRIAN POLE, OR PEDESTRIAN PUSHBUTTON POLE.

INCLUDE A 9" X 15" R10-3E SIGN WITH EACH ASSEMBLY.

REQUIRES POLE ADAPTER WHEN MOUNTING TWO UNITS ON THE SAME PEDESTRIAN POLE. ADDITIONAL MOUNTING EXTENSION BRACKETS SHALL BE PROVIDED IF A 10" MAXIMUM REACH FROM AN ACCESSIBLE SIDEWALK CANNOT BE ACHIEVED.

IF THE CURB RAMP IS NOT ALIGNED WITH THE CROSSWALK, THE ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY SHALL POINT IN THE DIRECTION OF TRAVEL, NOT IN THE DIRECTION OF THE CURB RAMP ORIENTATION.



COMMISSION 105 WEST CAPITOL

JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# TRAFFIC SIGNALS

ACCESSIBLE PEDESTRIAN SIGNALS

DATE EFFECTIVE: 04/01/2021 DATE PREPARED:

2/17/2021

902.05

9"x15" R10-3e SIGN -

ACCESSIBLE

PEDESTRIAN

SIGNAL

DETECTOR

\* PUSHBUTTON SHOULD BE MOUNTED AS CLOSE TO

LIMITATIONS AND GUIDANCE OF THE MUTCD.

3'-6" WITHOUT GOING OVER TO SATISFY THE

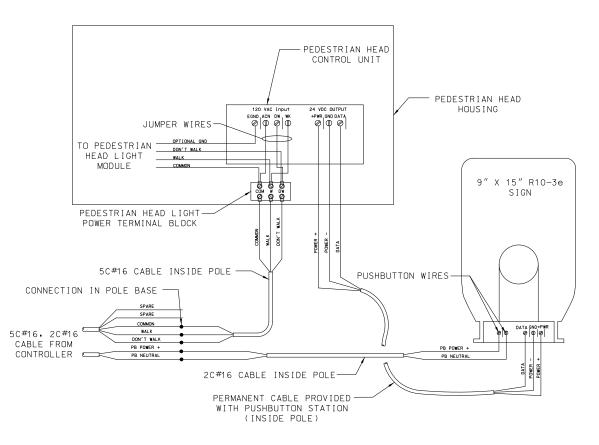
ACCESSIBLE PEDESTRIAN

SIGNAL ASSEMBLY

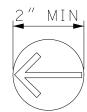
FINISHED SIDEWALK

ELEVATION

### 2-WIRE SYSTEM WIRING DETAILS







### ACTUATOR DETAIL

GENERAL NOTES:

ACCESSIBLE PEDESTRIAN SIGNAL ASSEMBLY MAY BE MONOLITHIC OR A SEPARATE ACTUATOR AND SIGN.

THE ACCESSIBLE PEDESTRIAN SIGNAL PUSHBUTTON SHALL BE OF THE PRESSURE-ACTIVATED TYPE WITH ESSENTIALLY NO MOVING PARTS. IT SHALL BE "ADA" COMPLIANT AND WEATHERPROOF.

THE HOUSING SHALL BE BLACK, FIT THE CURVATURE OF THE POST TO WHICH IT IS ATTACHED AND SHALL PROVIDE A RIGID INSTALLATION. ACCESSIBLE PEDESTRIAN SIGNAL CAN BE MOUNTED TO THE SIGNAL POLE, PEDESTRIAN POLE, OR PEDESTRIAN PEDESTAL POLE.

THERE SHALL BE A TACTILE ARROW POINTING IN THE DIRECTION OF PEDESTRIAN TRAVEL CONTROLLED BY THE BUTTON,

THE ACTUATOR SHALL BE A MINIMUM OF 2 INCHES IN DIAMETER, RAISED, CONTRAST VISUALLY WITH THE HOUSING AND MADE OF BRASS OR CORROSION-RESISTANT METAL ALLOY OR NON-METALLIC MATERIAL, A MAXIMUM FORCE OF 3.5 LBS SHALL BE REQUIRED TO ACTIVATE THE SWITCH. SWITCH SHALL BE OF THE SOLID-STATE ELECTRONIC, PIEZO TYPE.

THE ACCESSIBLE PEDESTRIAN SIGNAL SHALL OPERATE AT A VOLTAGE NO GREATER THAN 24 VOLTS, SOME MANUFACTURERS PROVIDE A 2-WIRE ACCESSIBLE PEDESTRIAN SIGNAL SYSTEM THAT USES THE EXISTING WIRING FROM PREVIOUSLY INSTALLED STANDARD PUSHBUTTONS, SOME MANUFACTURERS PROVIDE 3-WIRE AND 4-WIRE SYSTEMS, A 4-WIRE SYSTEM SHOULD BE SET UP JUST LIKE THE 3-WIRE SYSTEM, BUT IN THE 4-WIRE SYSTEM, AN EXTRA GROUND WIRE RUNS FROM THE PEDESTRIAN HEAD TO THE PUSHBUTTON. BOTH ARE ACCEPTABLE OPTIONS. THERE ARE SOME SYSTEMS THAT PROVIDE WIRELESS CONNECTIVITY FOR BLUETOOTH PROGRAMMING.

THE ACCESSIBLE PEDESTRIAN SIGNAL SHALL BE FULLY OPERATIONAL BETWEEN -30°F TO +165°F (-34°C TO +74°C), SHALL NOT ALLOW ICE TO FORM SUCH TO IMPEDE THE OPERATION OF THE BUTTON, AND SHALL HAVE A WEATHERPROOF SPEAKER.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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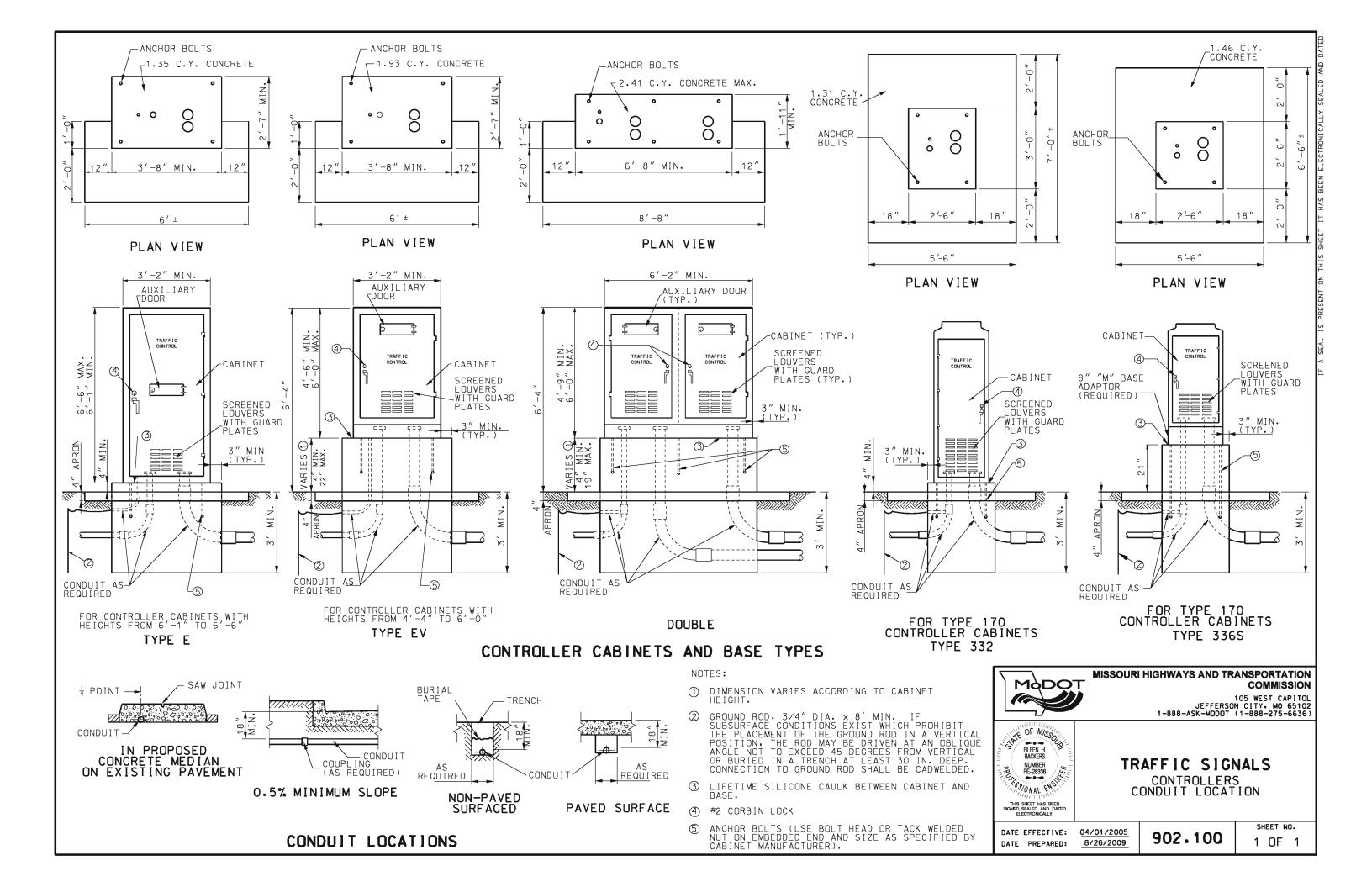
# TRAFFIC SIGNALS

ACCESSIBLE PEDESTRIAN SIGNALS

DATE EFFECTIVE: 04/01/2021 DATE PREPARED:

2/17/2021

902.05

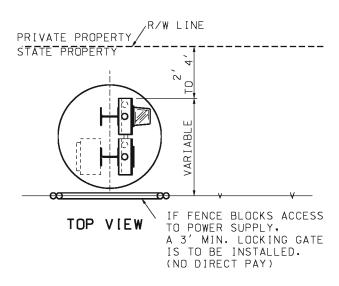


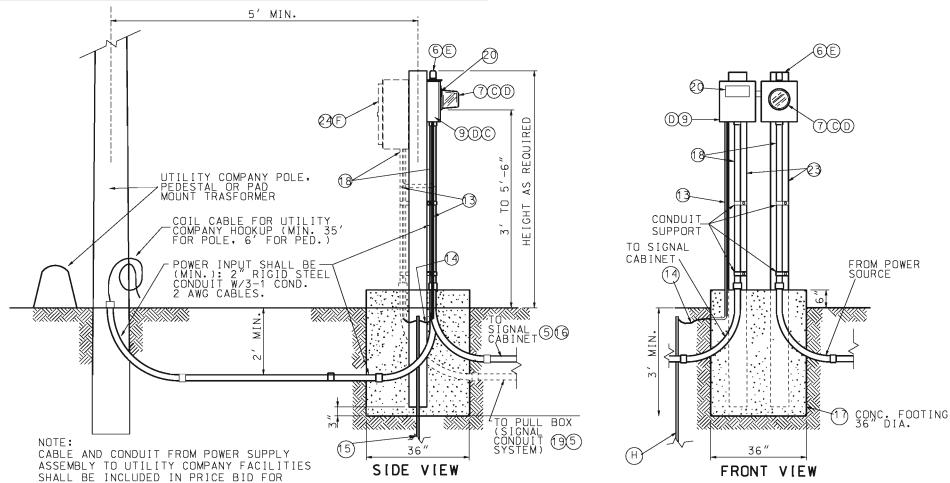
	LIST OF MATERIALS
ITEM	DESCRIPTION
1	SERVICE POLE 30' MIN., CLASS IV WOOD, CONTRACTOR PROVIDED, MODOT OWNED *
2	#8 AWG MIN. CABLE, 600 VOLT *
3	SERVICE ENTRANCE HEAD
4	GUY CABLE, AS REQUIRED
5	2" MIN, RIGID CONDUIT WITH PREFORMED ELBOWS
6	LIGHTNING ARRESTOR, VALVE TYPE, 2 POLE, 650 VOLT
7	METER SOCKET, 200 AMP, FOR SIGNALS
8	2" MIN. RIGID CONDUIT
9	SERVICE DISCONNECT BOX, LOCKING, RAINTIGHT, NEMA 4
10	INSULATED, GROUNDABLE NEUTRAL, 200 AMP MINIMUM
11	SIGNAL BREAKER, SINGLE POLE, 40A MIN, TYPE A OR B *
12	LIGHTING BREAKER, SINGLE POLE, 40A, TYPE A OR B
13	METAL CONDUIT, 1/2"
14	GROUND WIRE, #2 AWG MIN.
15	GROUND ROD, 3/4" x 8' MIN.
16	#8 AWG MIN. CABLE, 600 VOLT
17	CLASS B CONCRETE, 0.92 C.Y. ±
18	THREADED CONDUIT HUB WITH SEALING WASHERS
19	LIGHTING CABLES *
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS) VINYL RAISED LETTERING
21	TYPE B CONTROLLER AND SIGNAL BREAKER, AS SPECIFIED.
22	TYPE B AUXILIARY BREAKER, 15 AMP
23	W6 x 9 OR W6 x 15 GALVANIZED POST
24	LIGHTING CONTROL CABINET (SEE SHEET 2)
25	#2 AWG MIN. CABLE, 600 VOLT
*	SEE PLANS

POWER SUPPLY ASSEMBLY.

PEDESTAL OR NEW STATE-OWNED POLE TO BE SET WITHIN 2' TO 4' OF RIGHT-OF-WAY LINE,

ALL SERVICE POWER SUPPLY ASSEMBLIES ARE TO BE LOCATED ON STATE PROPERTY.





TYPE 2 (PEDESTAL)

UNDERGROUND SERVICE

NOTES

- A SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50'.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 50 FEET.
- © SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL, ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAIN-LESS STEEL METER SOCKET AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF DOOR
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET, IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE CONNECT CABINET
- (F) IF LIGHTING IS SPECIFIED, INSTALL LIGHTING CONTROL ON POWER SUPPLY.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN VERTICAL POSITION. THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CAD WELDED.

GENERAL NOTES: FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

THE TYPE POWER SUPPLY ASSEMBLY IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED. OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

FOR WIRING DIAGRAM AND LABEL DETAIL SEE SHEET 2 OF 4



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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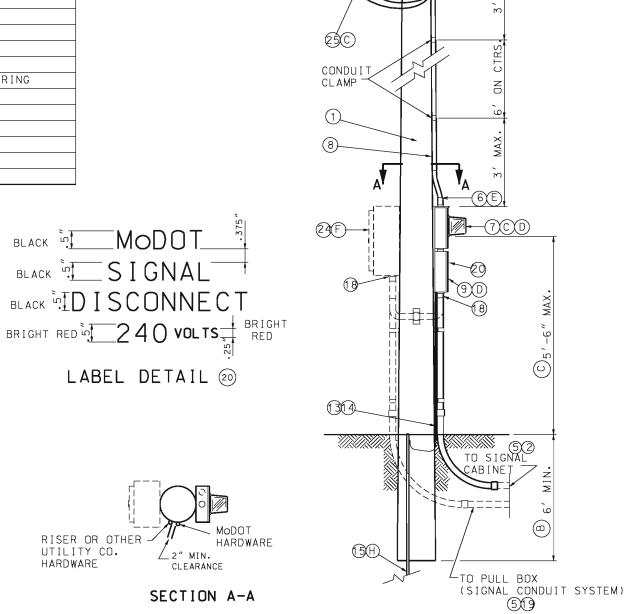
TRAFFIC SIGNALS POWER SUPPLY ASSEMBLY 240/120 VOLT SERVICE

DATE EFFECTIVE: 07/01/2004 DATE PREPARED:

8/26/2009

902.15K

	LIST OF MATERIALS				
ITEM	DESCRIPTION				
1	SERVICE POLE 30' MIN., CLASS IV WOOD, CONTRACTOR PROVIDED, MoDOT OWNED *				
2	#8 AWG MIN. CABLE, 600 VOLT *				
3	SERVICE ENTRANCE HEAD				
4	GUY CABLE, AS REQUIRED				
5	2" MIN. RIGID CONDUIT WITH PREFORMED ELBOWS				
6	LIGHTNING ARRESTOR, VALVE TYPE, 2 POLE, 650 VOLT				
7	METER SOCKET, 200 AMP, FOR SIGNALS				
8	2" MIN. RIGID CONDUIT				
9	SERVICE DISCONNECT BOX, LOCKING, RAINTIGHT, NEMA 4				
10	INSULATED, GROUNDABLE NEUTRAL, 200 AMP MINIMUM				
11	SIGNAL BREAKER, SINGLE POLE, 40A MIN, TYPE A OR B *				
12	LIGHTING BREAKER, SINGLE POLE, 40A, TYPE A OR B				
13	METAL CONDUIT, 1/2"				
14	GROUND WIRE, #2 AWG MIN.				
15	GROUND ROD, 3/4" x 8' MIN.				
16	#8 AWG MIN. CABLE. 600 VOLT				
17	CLASS B CONCRETE, 0.92 C.Y. ±				
18	THREADED CONDUIT HUB WITH SEALING WASHERS				
19	LIGHTING CABLES *				
20	WEATHERPROOF ADHESIVE LABEL (SIGNALS) VINYL RAISED LETTERING				
21	TYPE B CONTROLLER AND SIGNAL BREAKER, AS SPECIFIED.				
22	TYPE B AUXILIARY BREAKER, 15 AMP				
23	W6 x 9 OR W6 x 15 GALVANIZED POST				
24	LIGHTING CONTROL CABINET (SEE SHEET 2)				
25	#2 AWG MIN. CABLE, 600 VOLT				
*	SEE PLANS				



CLEVIS OR RACK

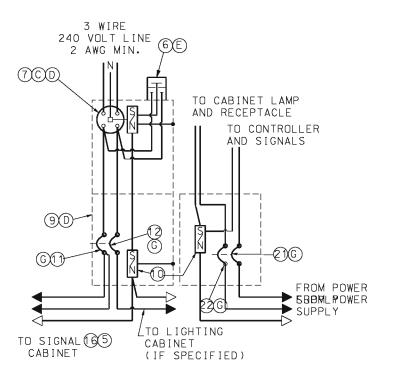
TRIPLEX SECONDARY SERVICE

LOCATION OF FACILITIES SHALL

COMPLY WITH UTILITY COMPANY

DROP BY UTILITY

CLEARANCE STANDARDS.



POWER SUPPLY

SIGNAL CABINET POWER PANEL

HARDWARE

WIRING DIAGRAM SIGNALS AND/OR LIGHTING

TYPE 1 (POLE) OVERHEAD SERVICE NOTES

- (A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50'.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 50 FEET.
- (C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL. ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAIN-LESS STEEL. METER SOCKET AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF DOOR
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET, IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE CONNECT CABINET
- (F) IF LIGHTING IS SPECIFIED, INSTALL LIGHTING CONTROL ON POWER SUPPLY.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- (H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CAD WELDED.

GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

THE TYPE POWER SUPPLY ASSEMBLY IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED. OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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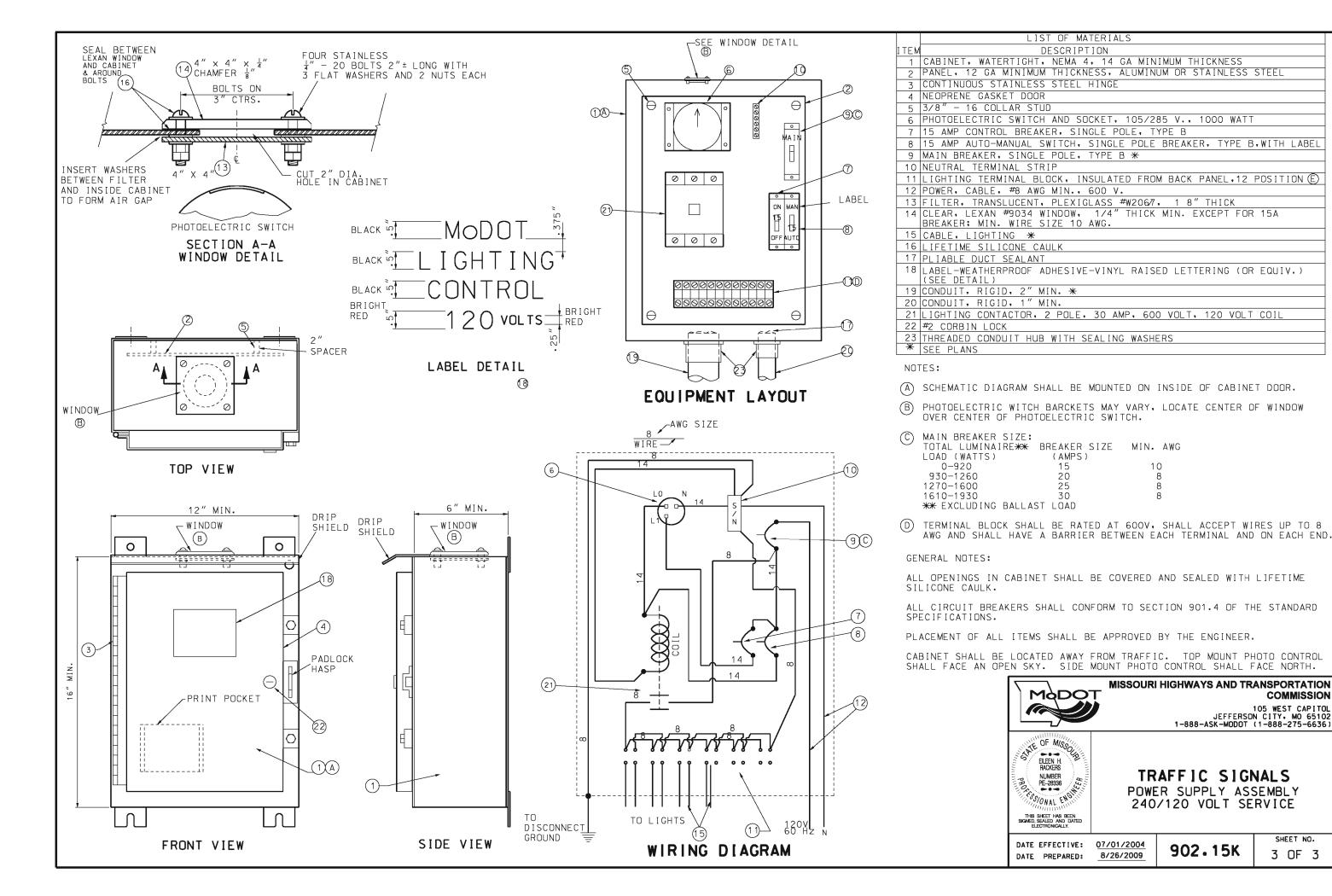


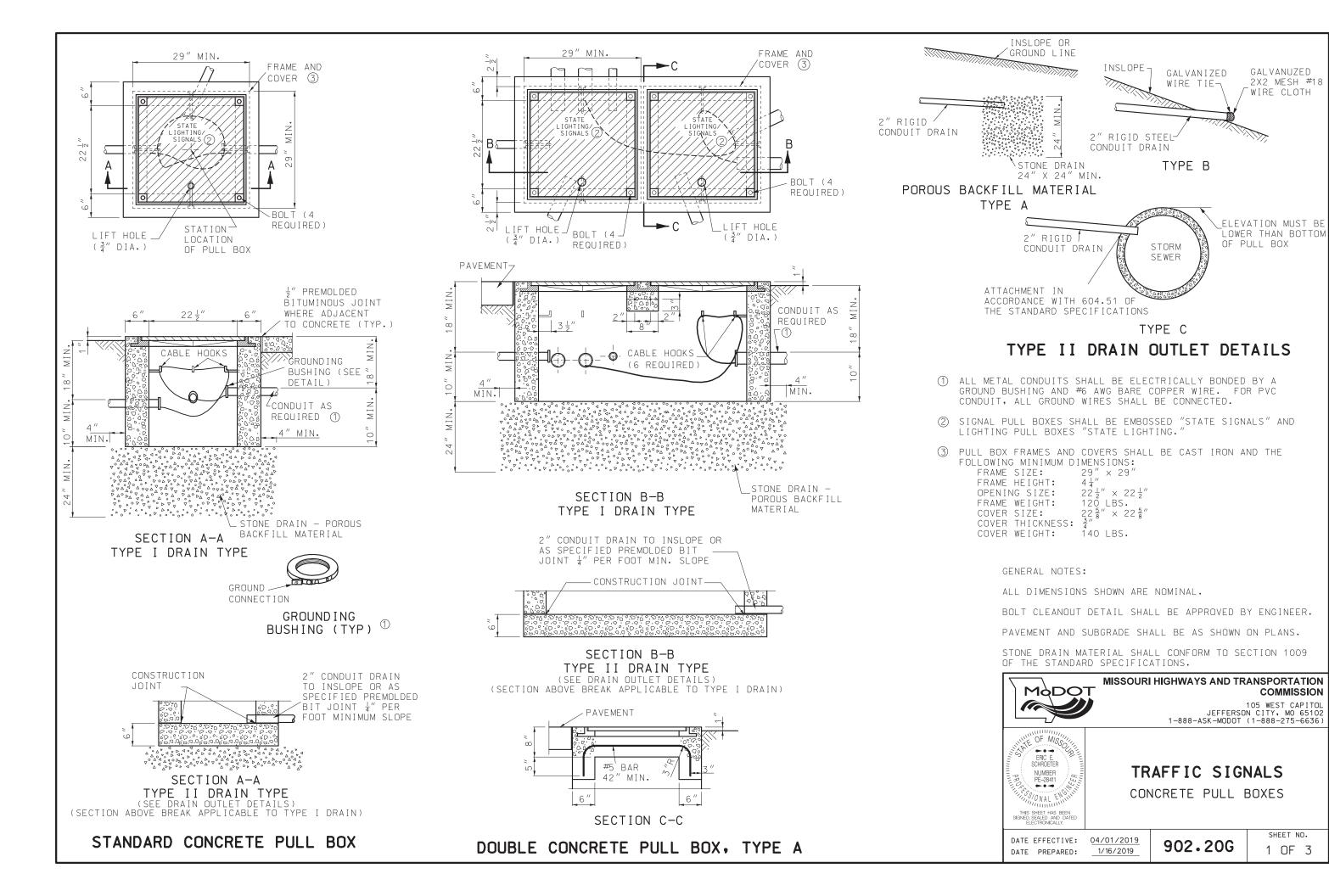
TRAFFIC SIGNALS POWER SUPPLY ASSEMBLY 240/120 VOLT SERVICE

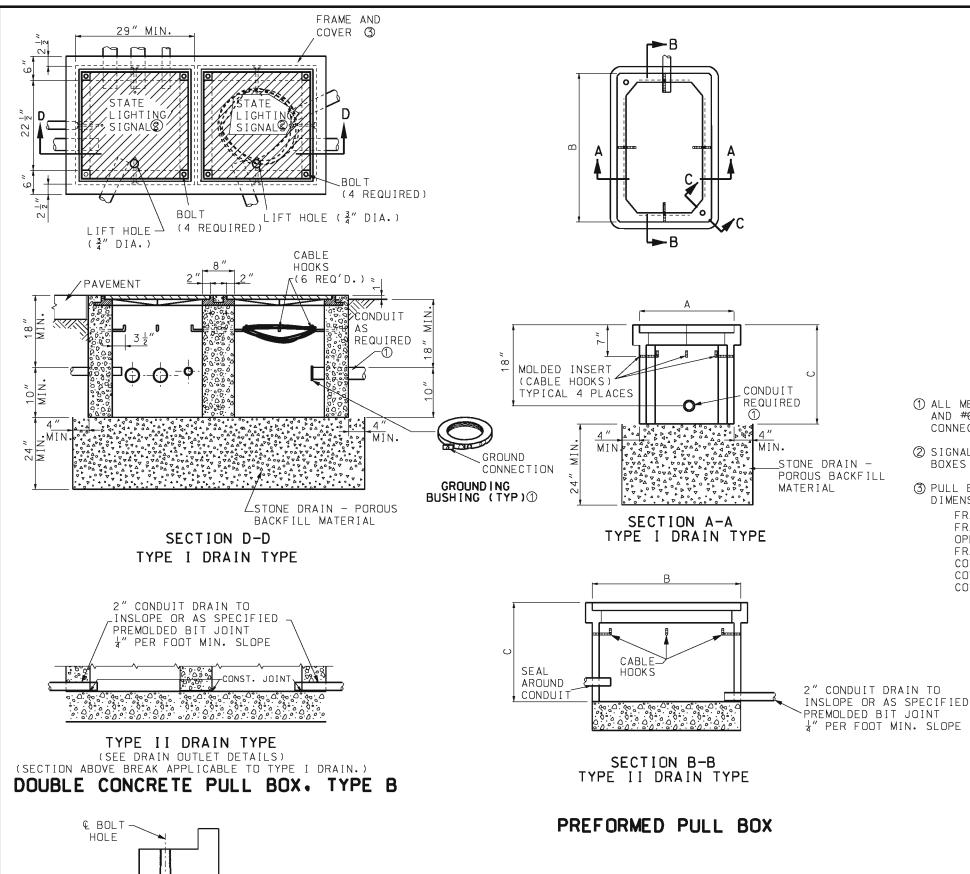
DATE EFFECTIVE: 07/01/2004 DATE PREPARED:

8/26/2009

902.15K

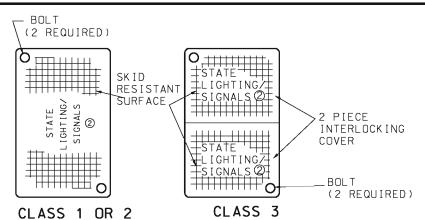






SECTION C-C

TYPICAL BOLT CLEANOUT



PREFORMED PULL BOX COVER

NUMBER OF ENTERING	CLASS	PREFORMED PULL BOX MINIMUM DIMENSIONS			
CONDUCTORS		А	В	С	
< 23	1	17"	30"	22"	
23 - 68	2	24"	36"	24"	
> 68	3	30"	48"	36"	

- ① ALL METAL CONDUITS SHALL BE ELECTRICALLY BONDED BY A GROUND BUSHING AND #6 AWG BARE COPPER WIRE. FOR PVC CONDUIT, ALL GROUND WIRES SHALL BE CONNECTED.
- ② SIGNAL PULL BOXES SHALL BE EMBOSSED "STATE SIGNALS" AND LIGHTING PULL BOXES "STATE LIGHTING.
- (3) PULL BOX FRAMES AND COVERS SHALL BE CAST IRON AND THE FOLLOWING MINIMUM DIMENSIONS:

FRAME SIZE: 29" X 29" FRAME HEIGHT:  $22\frac{1}{2}$ " x  $22\frac{1}{2}$ " 120 LBS. OPENING SIZE: FRAME WEIGHT:  $22\frac{5}{8}$ " x  $22\frac{5}{8}$ ' COVER SIZE: COVER THICKNESS: 140 LBS. COVER WEIGHT:

GENERAL NOTES:

IF AN EXTENSION IS USED WITH A PREFORMED BOX, THE LIP OF THE EXTENSION MAY BE INTERIOR OR EXTERIOR. THE EXTENSION SHALL BE COMPATIBLE AND FROM THE SAME MANUFACTURER.

IF PREFORMED PULL BOXES ARE SPECIFIED, THE CONTRACTOR MAY USE THE STANDARD CONCRETE PULL BOX IN LIEU OF THE CLASS 1 OR 2 PREFORMED PULL BOX OR THE DOUBLE CONCRETE PULL BOX, TYPE A, IN LIEU OF THE CLASS 3 PREFORMED PULL BOXES.



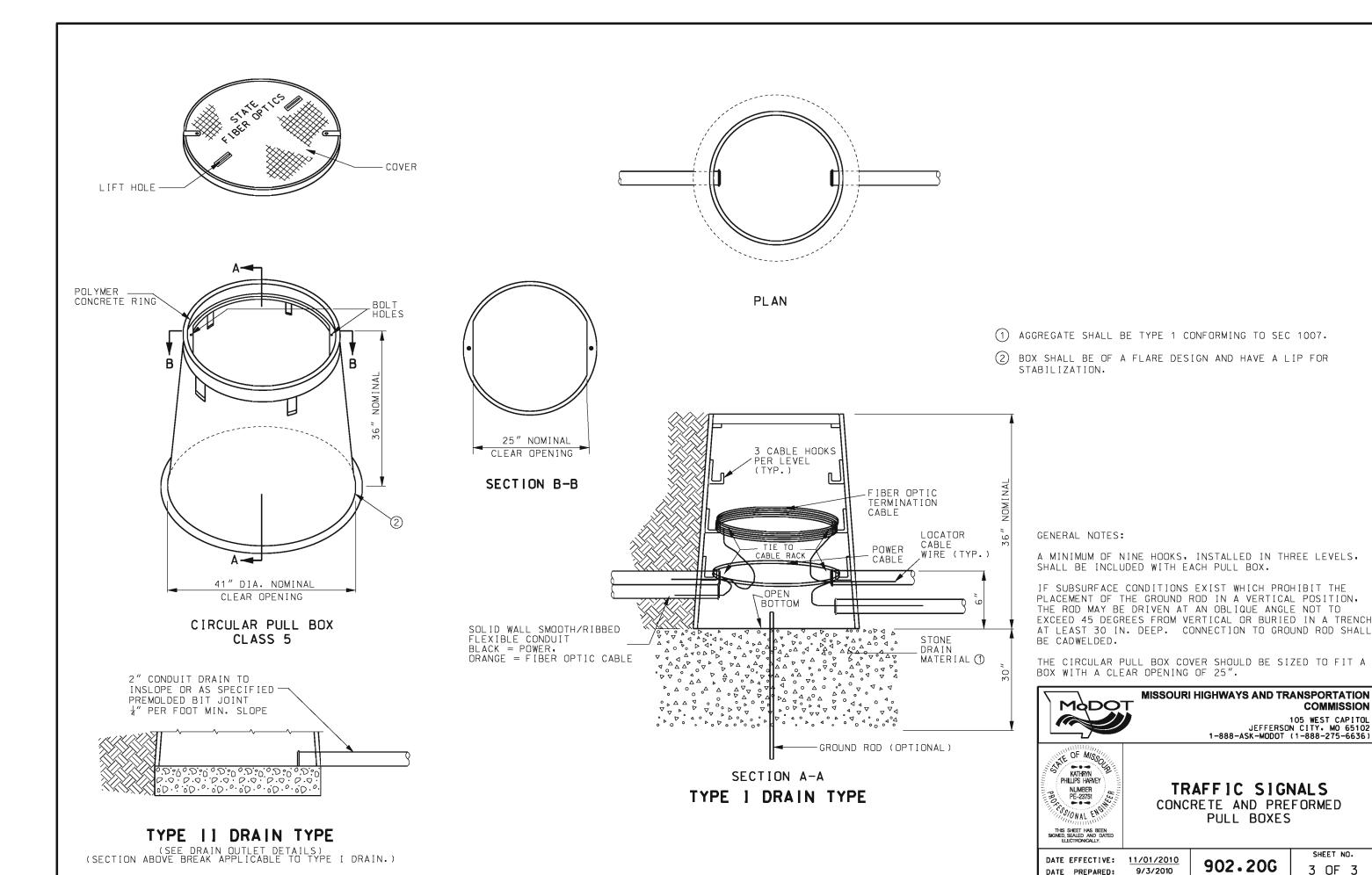
JEFFERSON CITY MO 65102 1-888-ASK-MODOT (1-888-275-6636)



TRAFFIC SIGNALS CONCRETE AND PREFORMED PULL BOXES

DATE EFFECTIVE: 11/01/2010 DATE PREPARED:

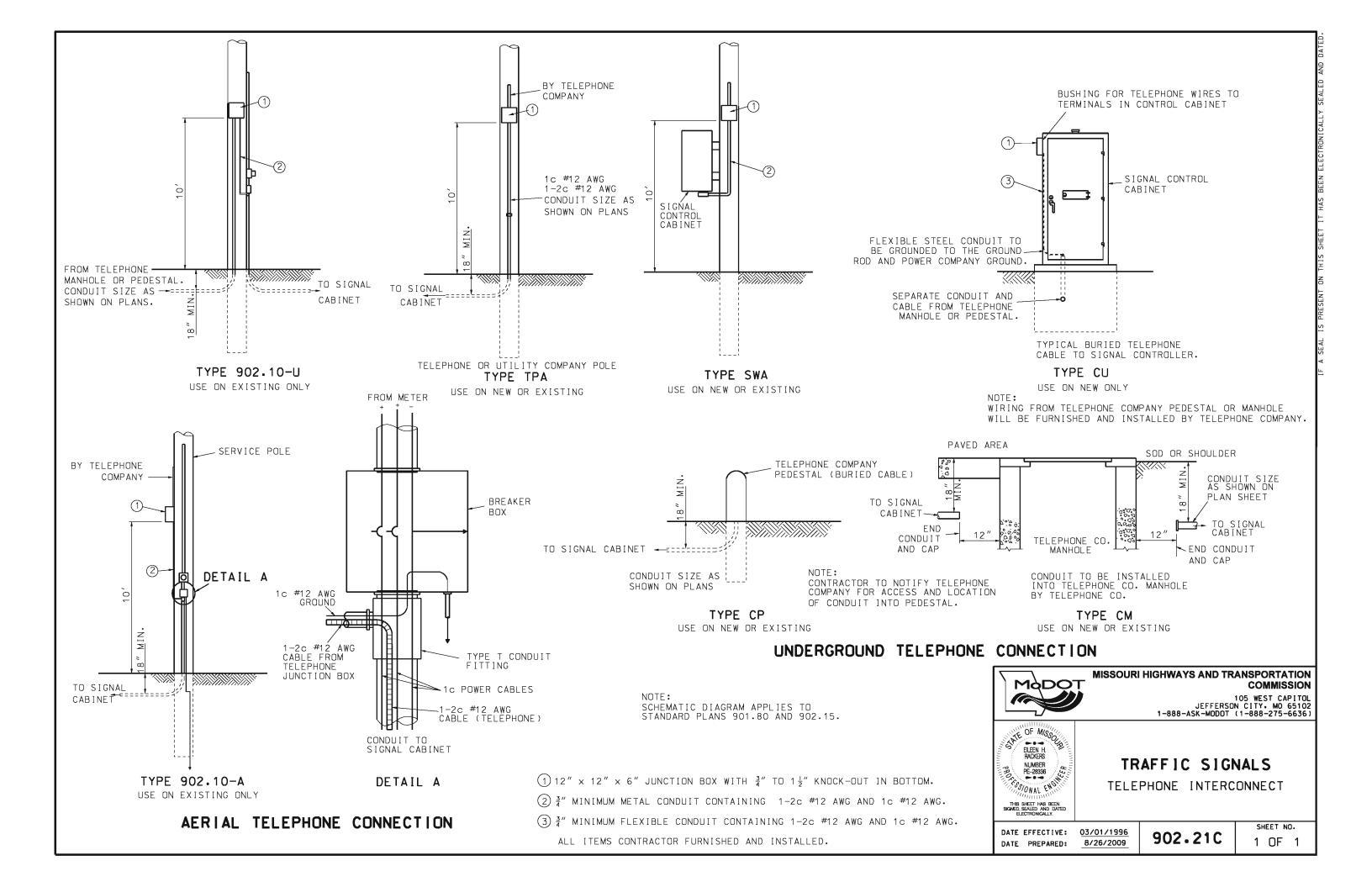
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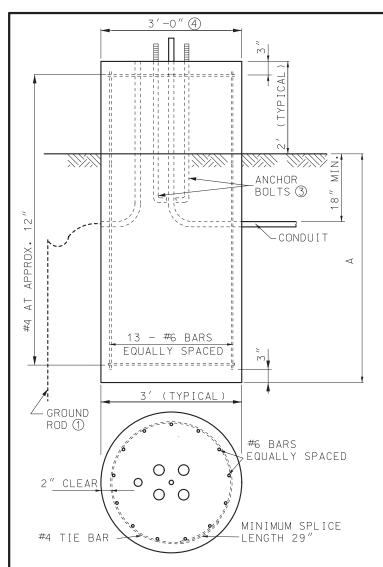


COMMISSION

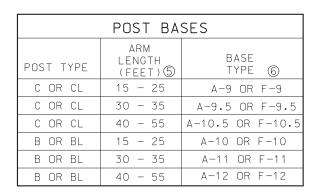
SHEET NO.

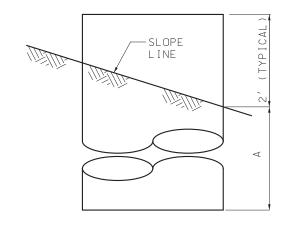
3 OF 3



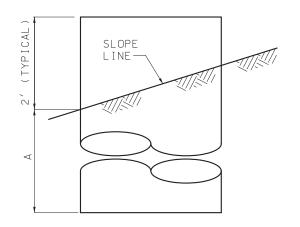


TYPE A (FLAT GROUND)





TYPE A (FILL) (FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)

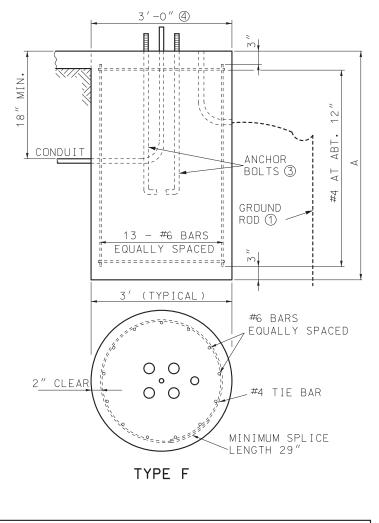


TYPE A (CUT) (FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)

### POST BASES

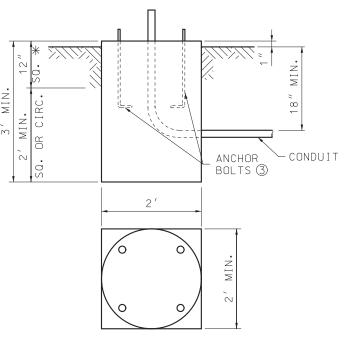
STEEL AND CONCRETE REQUIREMENTS FOR POST BASES®				
BASES		#6 STEEL BAR		CONC.
TYPE	A 7	LENGTH	WEIGHT LBS, 8	С.Ү.
A-9	9′-0″	10′-6″	300	2.88
A-9.5	9'-6"	11'-0"	310	3.01
A-10	10'-0"	11'-6"	320	3.14
A-10.5	10′-6″	12′-0″	330	3.27
A-11	11'-0"	12'-6"	350	3.40
A-12	12′-0″	13′-6″	380	3.67
F-9	9′-0″	8'-6"	240	2.36
F-9.5	9′-6″	9'-0"	250	2.49
F-10	10′-0″	9'-6"	270	2.62
F-10.5	10′-6″	10'-0"	280	2.75
F-11	11'-0"	10'-6"	300	2.88
F-12	12'-0"	11'-6"	320	3.14
C <del>*</del>				0.44

\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".



BASE EMBEDMENT IN S	SOLID ROCK	
SOLID ROCK	REQUIRED EMBEDMENT FOR BASE TYPE	
ENCOUNTER POINT	A-10 F-10	
AT SURFACE	4′-9″	
AT ONE-FOURTH NORMAL DEPTH	4′-0″	
AT ONE-HALF NORMAL DEPTH	3′-3″	
AT THREE-FOURTHS NORMAL DEPTH	1 ′ -3 ″	

- 1. REQUIRED EMBEDMENT DEPTHS CAN BE INTERPOLATED BETWEEN ENCOUNTER POINTS FOR OTHER SOLID ROCK ENCOUNTER DEPTHS.
- 2. NORMAL LENGTHS FOR ANCHOR BOLTS AND REINFORCING STEEL WILL BE REQUIRED.
- 3. CORE DRILL HOLES FOR ANCHOR BOLTS AND REINFORCING STEEL IN SOLID ROCK SHALL BE PROVIDED. CORE DRILL HOLES SHALL BE TWICE THE DIAMETER OF THE ANCHOR BOLT AND REINFORCING STEEL DIAMETER AND TO WITHIN 3 INCHES OF THE NORMAL BASE DEPTH.
- 4. IF SOIL, SHALE, GRAVEL, FRACTURED ROCK, OR VOIDS ARE ENCOUNTERED DURING CORE DRILLING, THE ROCK SHALL BE REMOVED TO THE POINT OF ENCOUNTER.
- ANCHOR BOLTS AND REINFORCING STEEL SHALL BE GROUTED IN THE CORE DRILL HOLES WITH NON-SHRINK GROUT HAVING A MINIMUM STRENGTH OF 9,000 POUNDS IN 24 HOURS.
- STRAIGHT ANCHOR BOLTS OF THE LENGTH SHOWN IN THE ANCHOR BOLT TABLE UNDER THE COLUMN "BOLT LENGTH' ARE ADEQUATE FOR USE IN GROUTED CORE DRILLED



\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

### TYPE C

- (1) APPLICABLE ONLY WHERE CONTROLLER IS MOUNTED TO A SIGNAL POLE.
- BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- (3) ANCHOR BOLT DIMENSIONS ARE SHOWN ON THE MANUFACTURER'S APPROVED DRAWINGS.
- (4) MAXIMUM BOLT CIRCLE DIAMETER IS 26". BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- (5) ARM LENGTH DETERMINED BY LENGTH OF LONGEST ARM FOR TYPE B & BL SIGNAL POSTS.
- BASE TYPE A OR F DETERMINED BY LOCATION OF POST BASE.
- 7 SOIL DEPTH, NO ROCK.
- (8) WEIGHT INCLUDES #4 TIE BARS.
- (9) WHEN CONCRETE BASE IS LOCATED WITHIN 8" CONCRETE DIVISIONAL ISLAND, EMBEDMENT LENGTH MAY BE REDUCED BY 1/2 DIAMETER OF THE DRILLED SHAFT,



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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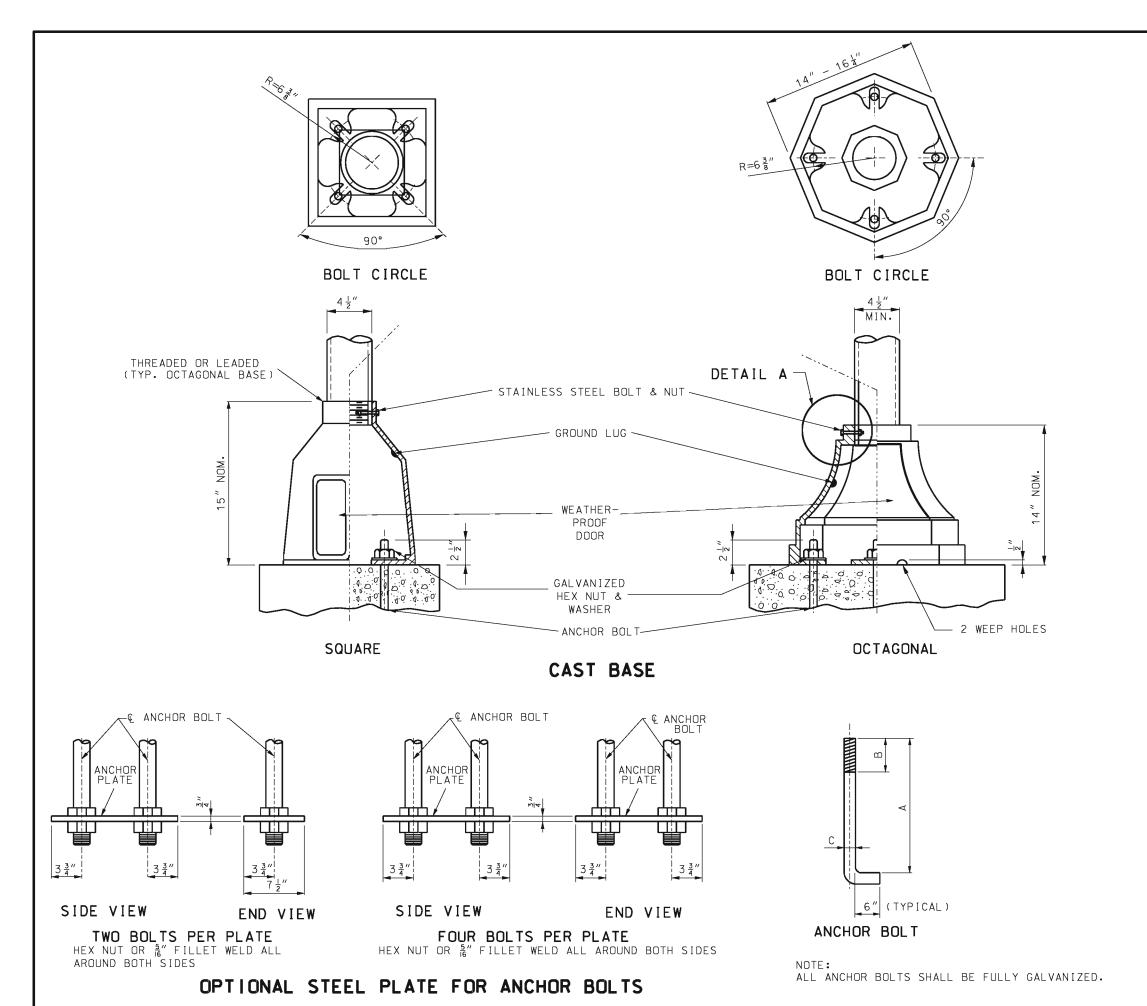
### TRAFFIC SIGNALS

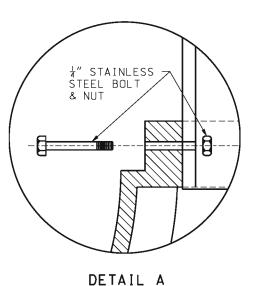
POST BASES

DATE EFFECTIVE: 07/01/2019 DATE PREPARED:

5/20/2019

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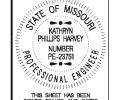


BOLT LENGTH	VERT. HT. A	THREAD LEN. B	DIA. C
INCHES	INCHES	INCHES	INCHES
19	17	1.50	0.625
57	51	7.00	1.250
79	73	7.50	1.500
94	88	8.00	1.750
121	115	8.50	2.000
120	114	9.00	2.250
146	140	9.50	2.500



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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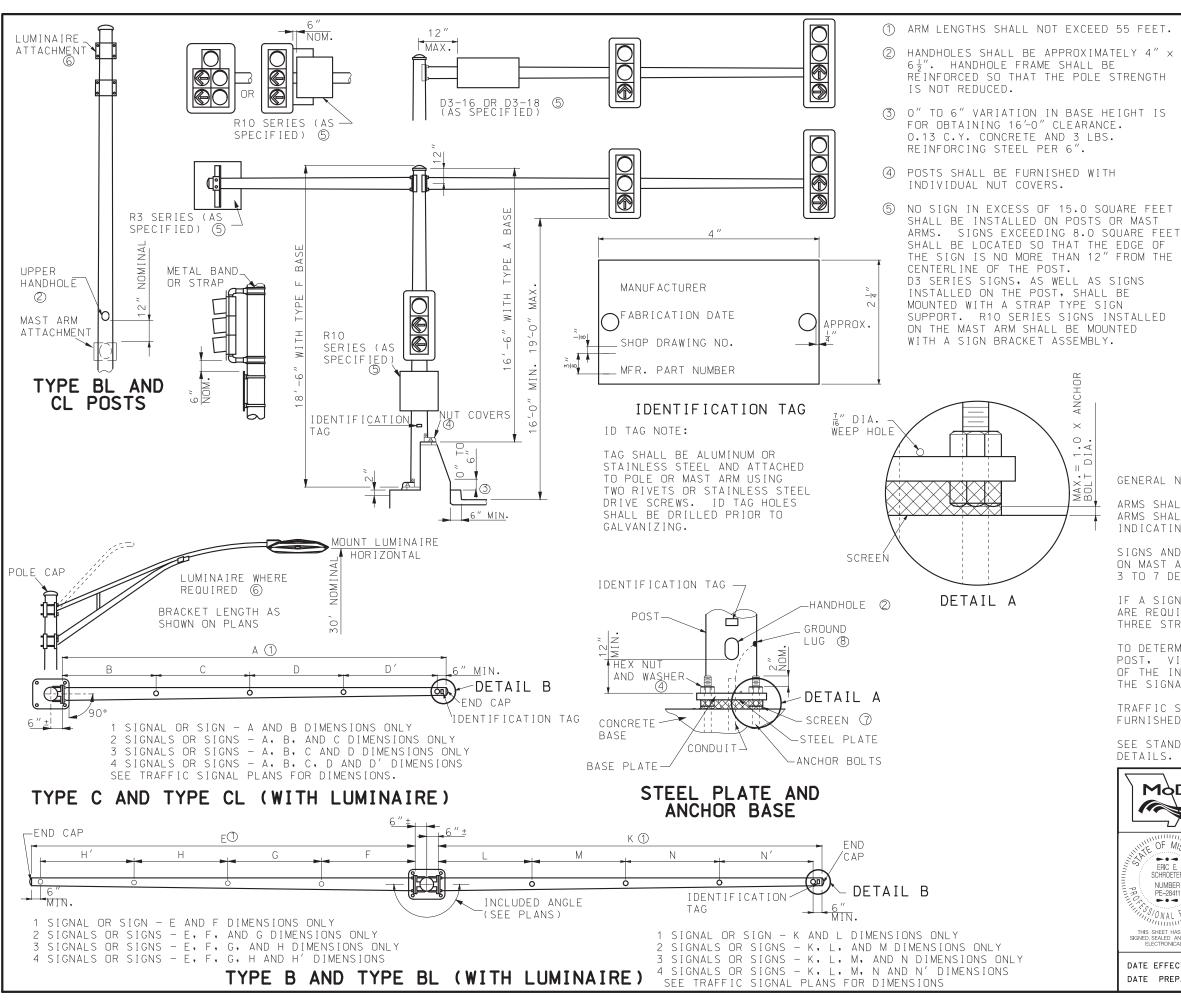
TRAFFIC SIGNALS

POST BASES

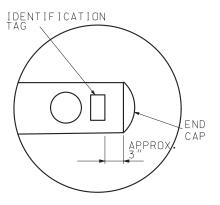
DATE EFFECTIVE: 02/01/2008 DATE PREPARED:

8/26/2009

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- 6 SEE DRAWING 901.00 FOR TYPICAL BRACKET ARM MOUNTING FOR TYPE BL AND TYPE CL
- 7 A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT, THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.
- POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH # 6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM, GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.



DETAIL B

GENERAL NOTES:

ARMS SHALL BE RAKED UP 0.25" PER FOOT MINIMUM. ARMS SHALL BE PROVIDED WITH A PERMANENT MARKING INDICATING PROPER ORIENTATION FOR INSTALLATION.

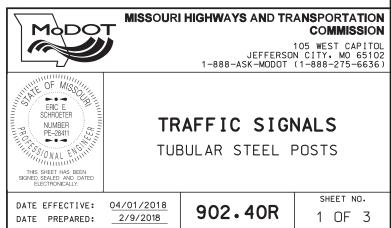
SIGNS AND SIGNALS SHALL BE VERTICAL. SIGNAL HEADS ON MAST ARMS SHALL BE TILTED FORWARD FROM THE TOP 3 TO 7 DEGREES FROM VERTICAL.

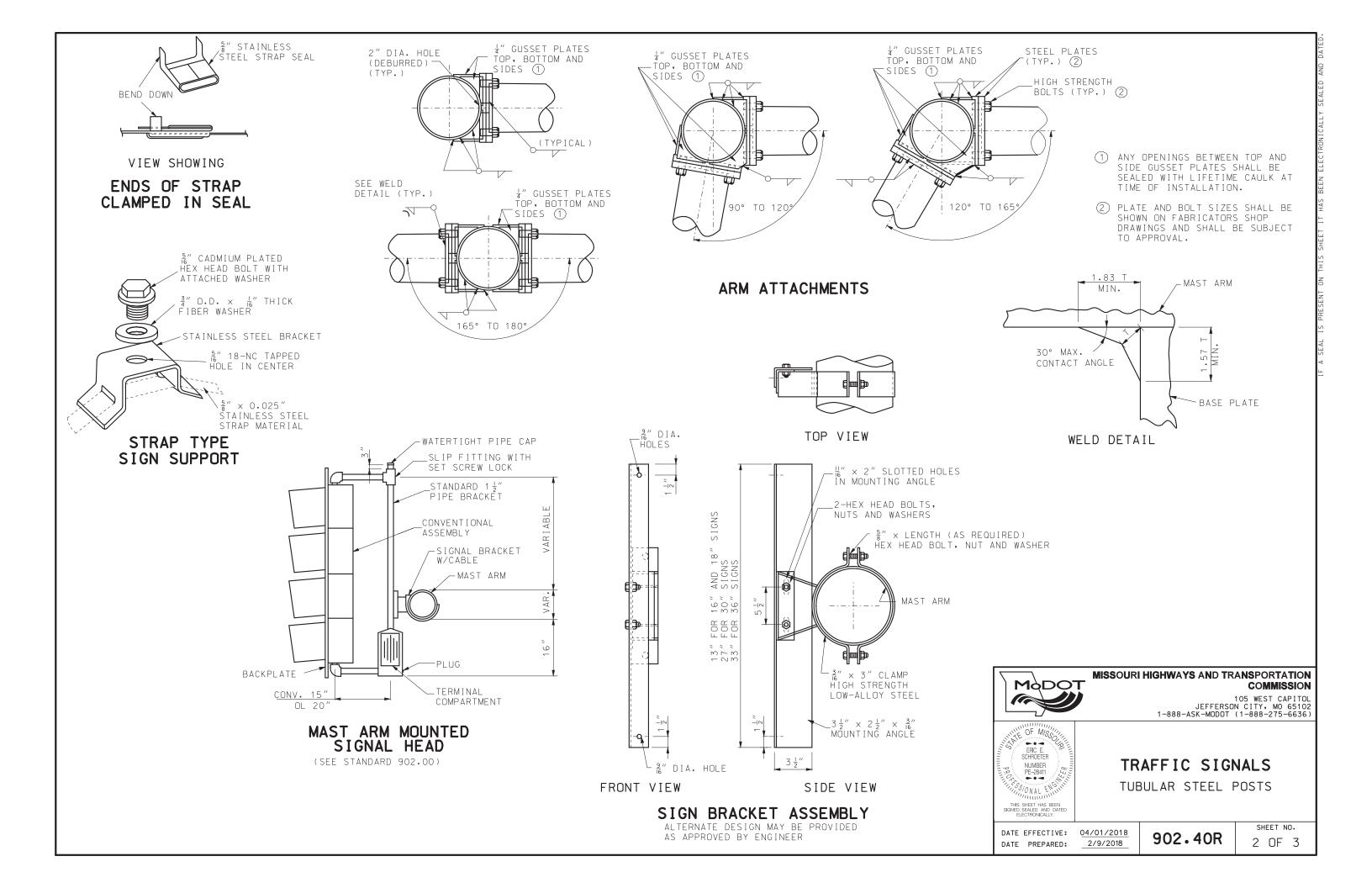
IF A SIGN EXCEEDS 42" IN LENGTH, TWO STRAP SUPPORTS ARE REQUIRED: AND IF A SIGN EXCEEDS 96" IN LENGTH, THREE STRAP SUPPORTS ARE REQUIRED.

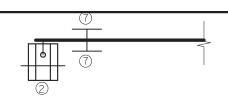
TO DETERMINE LEFT OR RIGHT ON TYPE B OR C SIGNAL POST, VIEWING POSITION SHALL BE FROM THE CENTER OF THE INTERSECTION BEING CONTROLLED AND FACING THE SIGNAL INVOLVED.

TRAFFIC SIGNALS MOUNTED ON MAST ARMS SHALL BE FURNISHED WITH MOUNTING BRACKETS UTILIZING CABLES.

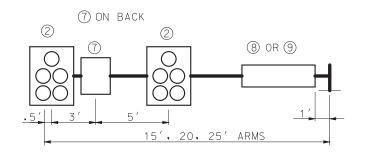
SEE STANDARD 902.30 FOR FOUNDATION AND ANCHOR BOLT DETAILS.

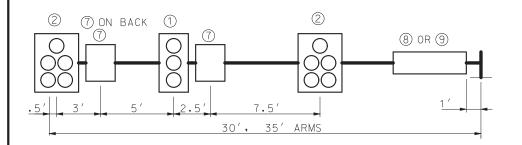


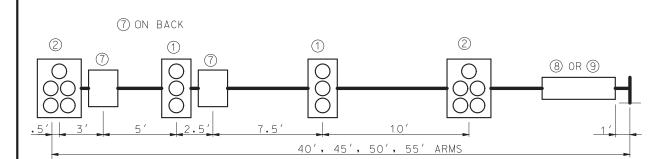




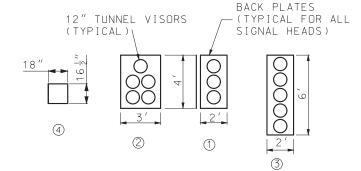
TYPICAL TOP VIEW







MAST ARM LOADING



TYPICAL POST LOADING

15′-0″

2-3

2-4

TYPE A BASE

TYPE F BASE

AS REQUIRED

<u>®</u>Ю

SECTION A-A

6

MINIMUM DESIGN LOADING FOR POST AND MAST ARM ATTACHMENTS

ITEM NO.	DESCRIPTION	WEIGHT (LBS.)*	PROJ. AREA (SQ.FT.)	SURFACE AREA (SQ.FT.)
1	3-SECTION OL HEAD	95.0	8.0	32.5
2	5-SECTION OL HEAD	173.0	12.0	47.5
3	VERT, 5-SECT, OL HEAD	100.0	12.0	50.5
4	1-SECTION PED HEAD	15.0	2.0	XX.X
5	LED-A LUMINAIRE	30.0	1.0	3.5
6	9" X 12" SIGN	2.0	0.8	N/A
7	30" X 36" SIGN	13.0	7.5	N/A
8	120" X 18" SIGN	25.0	15.0	N/A
9	96" X 16" SIGN	18.0	10.7	N/A
	96" X 18" SIGN	20.0	12.0	N/A

OL- OPTICALLY LIMITED

\* MOUNTING HARDWARE INCLUDED

STRUCTURAL DESIGN REQUIREMENTS:

STRUCTURAL SUPPORTS SHALL BE DESIGNED AND FABRICATED TO WITHSTAND THEIR OWN LOADING AND THE ATTACHMENT LOADING SHOWN ON THIS DRAWING OR ON THE PLANS, WHICHEVER IS GREATER. STRUCTURAL MEMBERS INCLUDE POSTS, MAST ARMS AND LUMINAIRE BRACKET ARMS, AS REQUIRED.

DESIGN OF STRUCTURAL SUPPORTS SHALL BE BASED ON AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS, 1994 OR LATEST REVISION, WITH THESE EXCEPTIONS:

MINIMUM DESIGN WIND SPEED OF 90 MPH AT 30 FEET ABOVE GROUND.

GROUP LOADING:

LOADS

PERCENT OF ALLOWABLE STRESS (ALL MATERIALS)

GROUP I - DL 100 GROUP II - DL + W 133 GROUP III - DL + ICE + 0.5(W\*\*)

\* NO LOAD REDUCTION FACTORS SHALL BE APPLIED IN CONJUNCTION WITH THESE INCREASED ALLOWABLE STRESSES.

\*\* W TO BE COMPUTED ON THE BASIS OF THE WIND PRESSURE FORMULA, 25 PSF (1197 Pa) MINIMUM FOR W FOR GROUP III.

FOR TYPE B AND BL POSTS, ICE AND DEAD LOADING SHALL BE BASED ON THE COMBINED EFFECT OF DESIGN LOADING ON EACH ARM, WIND LOADING IS APPLIED AS DESCRIBED IN SECTION 1.2.5(5)(b) OF THE STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS, 1994 REVISION.

GENERAL NOTES:

ATTACHMENT LOCATIONS ARE FOR STRUCTURAL DESIGN PURPOSES ONLY. ACTUAL LOCATIONS ARE SHOWN ON THE PLANS.

LUMINAIRE PER MODOT'S STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS.



### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

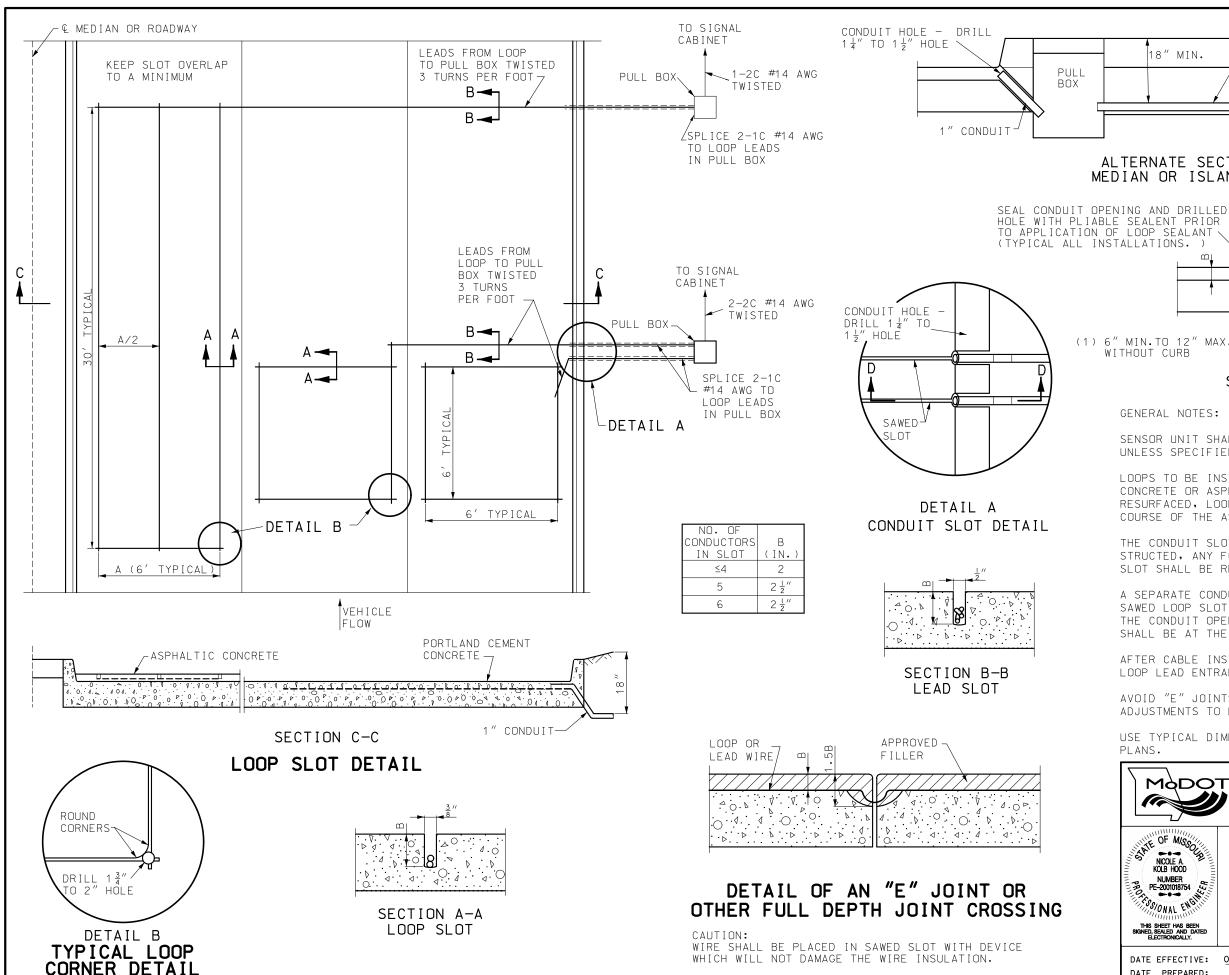
105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

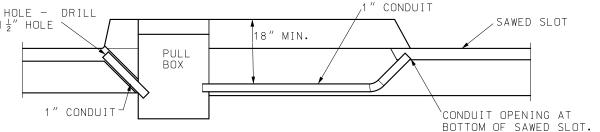


TRAFFIC SIGNALS TUBULAR STEEL POSTS DESIGN LOADING REQUIREMENTS

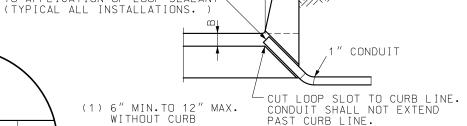
DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018

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### ALTERNATE SECTION D-D MEDIAN OR ISLAND DETAIL



### SECTION D-D

GENERAL NOTES:

SENSOR UNIT SHALL BE HOUSED IN CONTROLLER CABINET UNLESS SPECIFIED OTHERWISE.

LOOPS TO BE INSTALLED, WHEN EXISTING PORTLAND CEMENT CONCRETE OR ASPHALTIC CONCRETE PAVEMENT IS BEING RESURFACED, LOOPS SHALL NOT BE PLACED IN SURFACE COURSE OF THE ASPHALTIC CONCRETE.

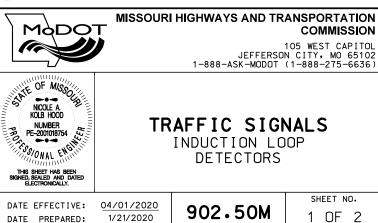
THE CONDUIT SLOT MAY BE POWER OR MANUALLY CON-STRUCTED, ANY FORMING NEEDED TO SECURE CONDUIT IN SLOT SHALL BE REMOVED.

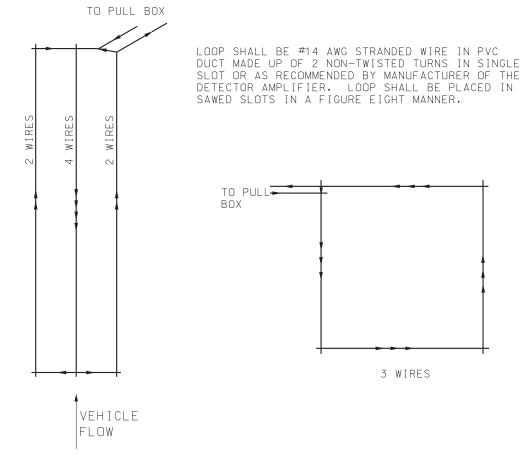
A SEPARATE CONDUIT SHALL BE INSTALLED BETWEEN THE SAWED LOOP SLOT AND THE FIRST PULL BOX FOR EACH LOOP. THE CONDUIT OPENING AT THE END OF THE LEAD-IN SLOT SHALL BE AT THE BOTTOM OF THE SAWED SLOT.

AFTER CABLE INSTALLATION, THE CONDUIT OPENING AT THE LOOP LEAD ENTRANCE SHALL BE SEALED.

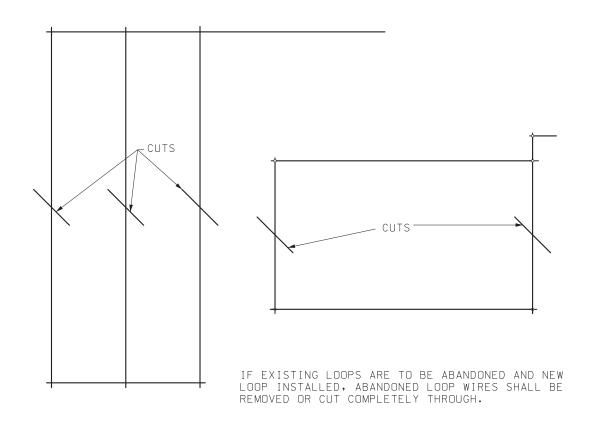
AVOID "E" JOINTS OR OTHER FULL DEPTH JOINTS, MINOR ADJUSTMENTS TO LOOP LOCATION MAY BE MADE.

USE TYPICAL DIMENSIONS UNLESS OTHERWISE SHOWN ON PLANS.





LOOP CONFIGURATION



### ABANDONED LOOPS



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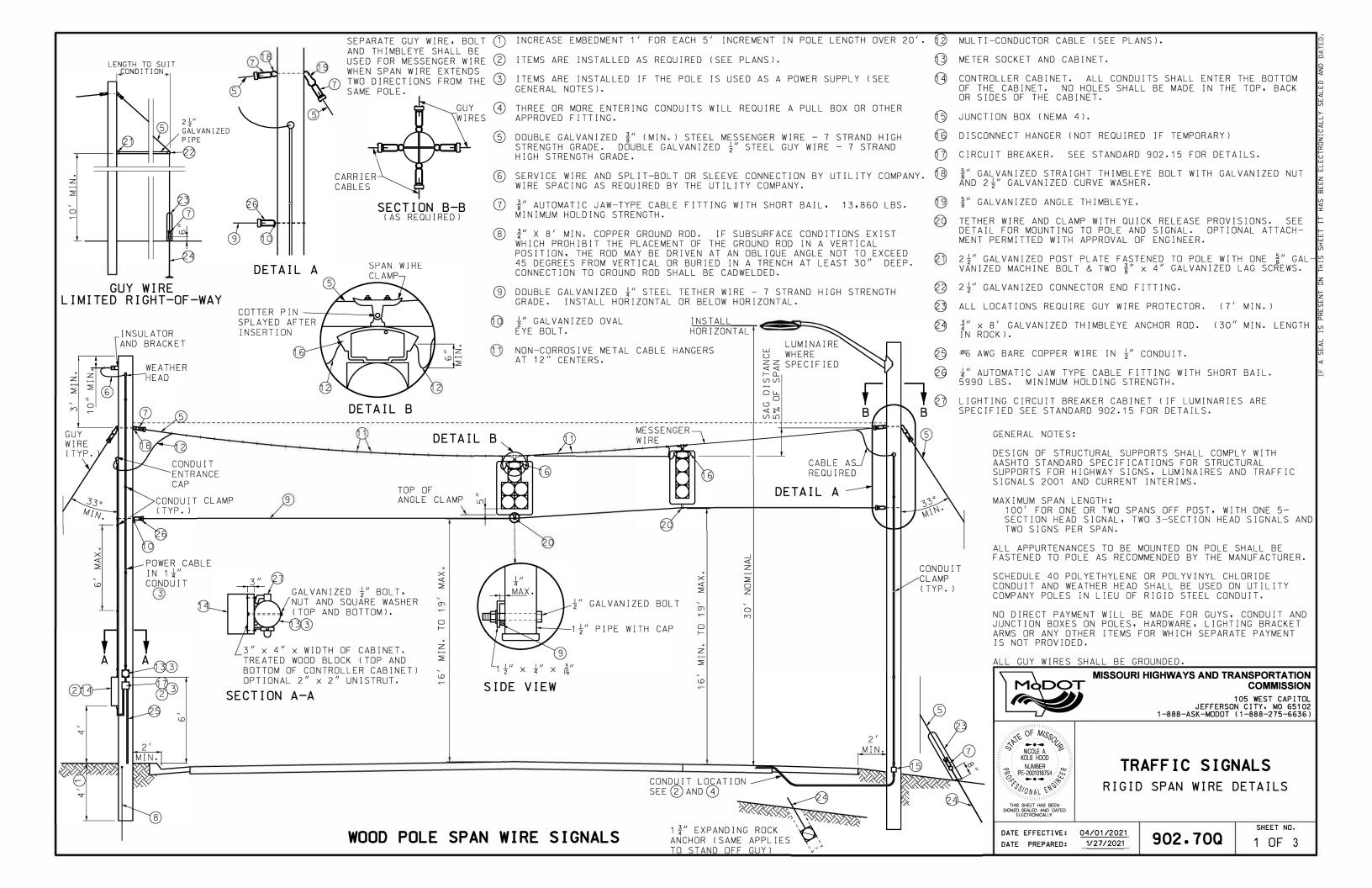
TRAFFIC SIGNALS INDUCTION LOOP DETECTORS

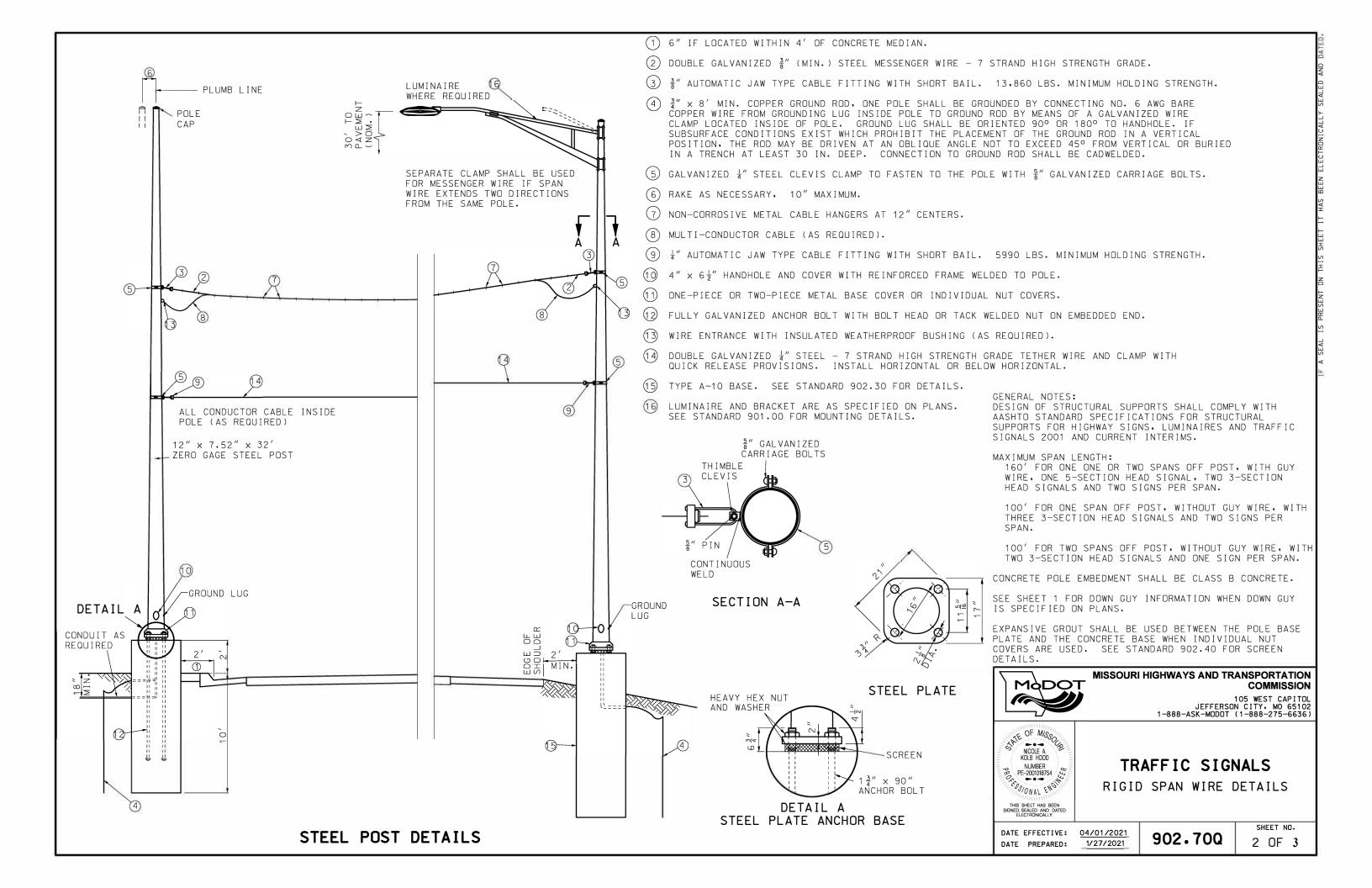
DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019

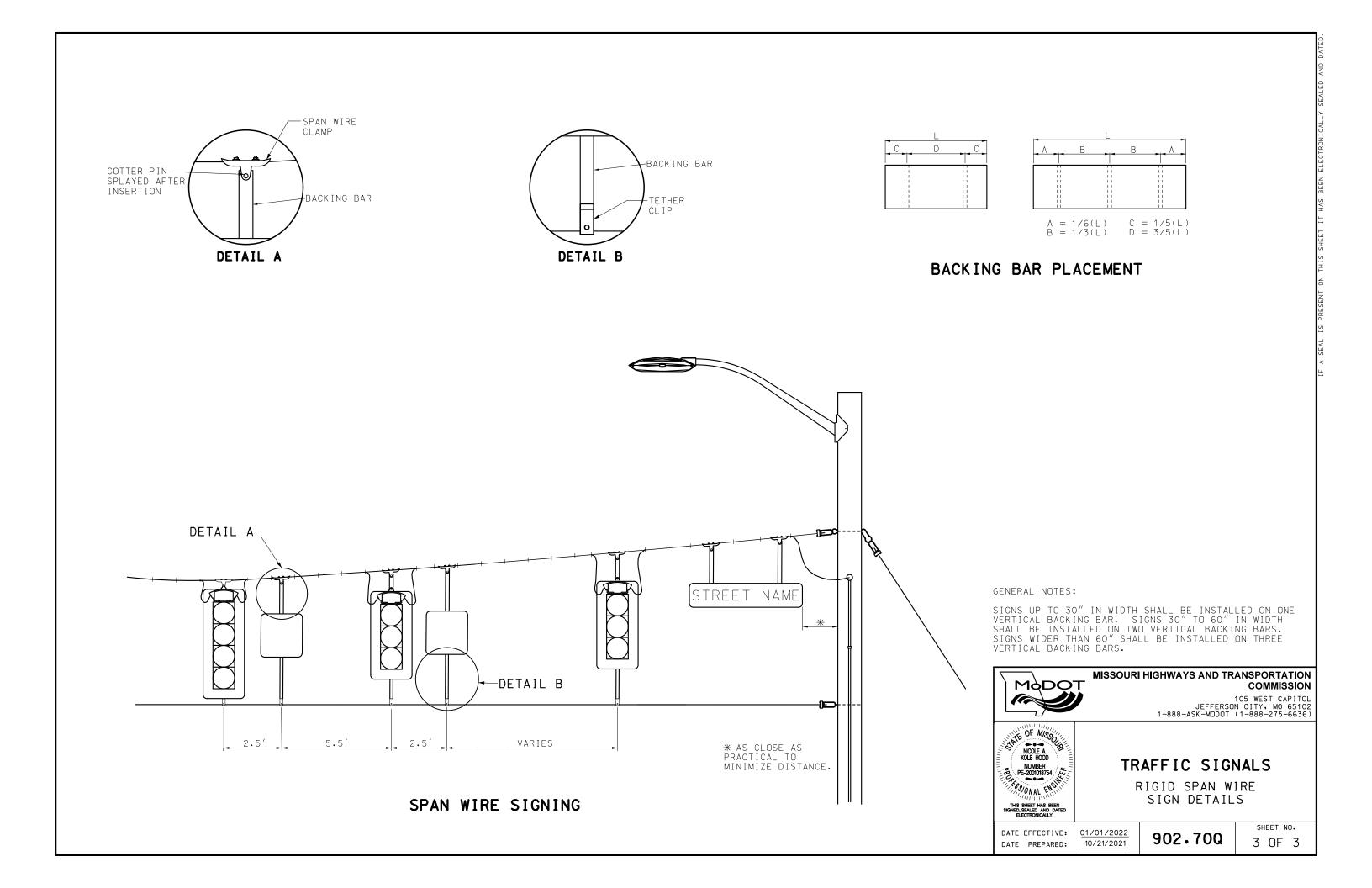
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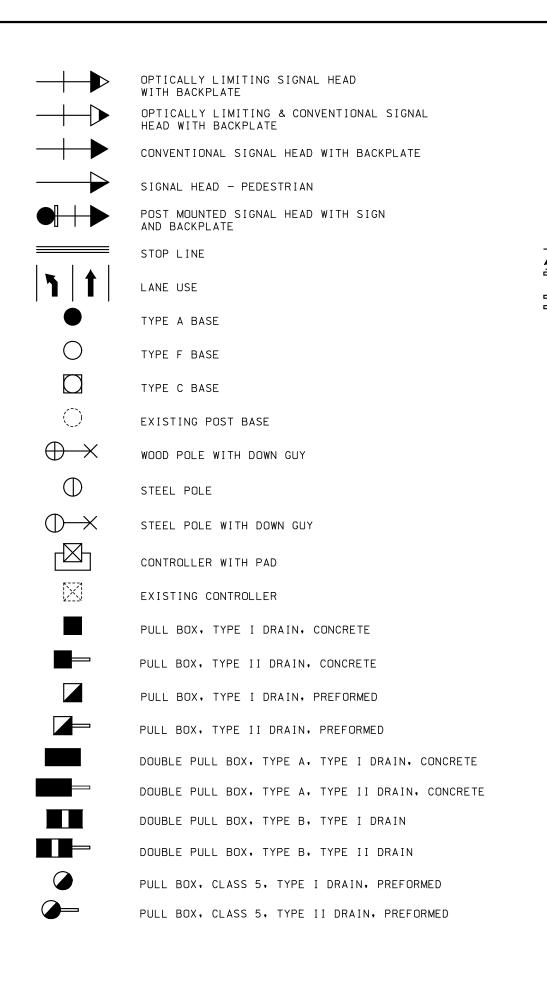
SHEET NO.

2 OF 2









Г J Г J	EXISTING PULL BOX
$\varnothing$	SERVICE POLE OR PEDESTAL AND POWER SUPPLY
Ø	EXISTING SERVICE POLE
lacktriangle	LED - A LUMINAIRE
<u> </u>	SPAN WIRE WITH SIGNAL HEAD
<b>1</b>	MAST ARM WITH SIGNAL HEADS AND LED - A LUMINAIRE
	MAST ARM WITH OVERHEAD SIGN
	INDUCTION LOOP DETECTOR
V	VIDEO DETECTION ZONE
•	PUSH BUTTON DETECTOR
<b> -</b>	CAPPED RIGID CONDUIT
	RIGID CONDUIT IN TRENCH
	RIGID CONDUIT PUSHED
===	EXISTING RIGID CONDUIT
<b>■</b> B <b>■</b> B <b>■</b>	RIGID CONDUIT ON BRIDGE
<b>M</b>	RIGID CONDUIT IN MEDIAN
3 "	SIZE OF CONDUIT
3-7c #16	NUMBER & AWG SIZE OF CABLE
	SIGNAL FACE NUMBER
7	POST NUMBER
7	DETECTOR NUMBER
7	PULL BOX NUMBER
	WALK INTERVAL
<b>*</b>	DON'T WALK INTERVAL
	FLASHING DON'T WALK INTERVAL

R	RED (CIRCULAR)
FR	FLASHING RED (CIRCULAR)
RL	RED LEFT ARROW
Υ	YELLOW (CIRCULAR)
FΥ	FLASHING YELLOW (CIRCULAR)
FYA	FLASHING YELLOW ARROW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
YL	YELLOW LEFT ARROW
YR+	YELLOW RIGHT ARROW
G	GREEN (CIRCULAR)
S	GREEN STRAIGHT ARROW
L	GREEN LEFT ARROW
R†	GREEN RIGHT ARROW
<b></b> ¶R[	TUNNEL VISOR WITH LOUVER

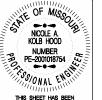
ALL 12 INCH WITH TUNNEL VISOR

SIGN	LEGEND
R10 - 10L	LEFT TURN SIGNAL
R10 - 10R	RIGHT TURN SIGNAL
R3 - 5L	LEFT ARROW (SYMBOL) ONLY
R3 - 5R	RIGHT ARROW (SYMBOL) ONLY
R3 - 5A	STRAIGHT ARROW (SYMBOL) ONLY
R3 - 6L	LEFT ARROW - STRAIGHT ARROW (SYMBOL)
R3 - 6R	RIGHT ARROW - STRAIGHT ARROW (SYMBOL)
R3 - 2	NO LEFT TURN (SYMBOL)
R3 - 1	NO RIGHT TURN (SYMBOL)
R3 - 3	NO TURNS
D3 - 1	STREET NAME (ONE LINE)
D3 - 1B	STREET NAME (TWO LINE)
R10 - 3E	CROSSWALK (PEDESTRIAN SYMBOL)
R10 - 11A	NO TURN ON RED
R10 - 13	EMERGENCY SIGNAL
R10 - 27A	LEFT TURN YIELD ON FLASHING ARROW



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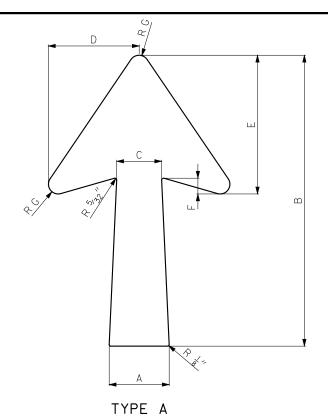


TRAFFIC SIGNALS TRAFFIC SIGNAL SYMBOLS

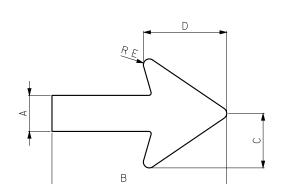
DATE EFFECTIVE: 04/01/2020 DATE PREPARED: 1/21/2020

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SHEET NO. 1 OF 1



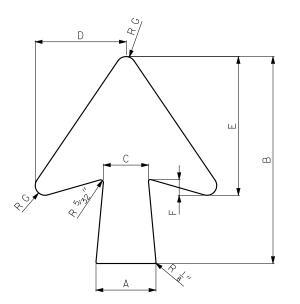
TYPE A ARROW TABLE							
LETTER SIZE	А	В	С	D	E	F	RG
8" U.C.	5″	25"	3 3 "	7 <u>9</u> "	11 <sup>8</sup> / <sub>16</sub> "	1 ½"	<u>13</u> "
10.67" & 13.33" U.C.	6"	30"	4 ½"	9 ½"	14"	1 ½"	<u>3</u> //
16" U.C.	7 <u>l</u> "	35 "	5 <del>3</del> "	11 \frac{1}{8}"	17"	1 3 "	1 "



TYPE D

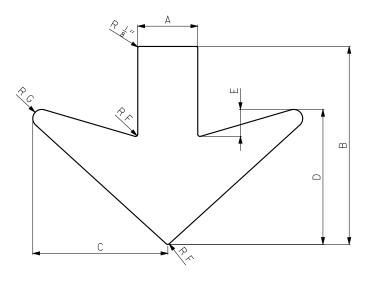
TYPE D ARROW TABLE							
LETTER SIZE	А	В	С	D	RE		
6" U.C.**	2 ¼"	9" MIN.	3 "	4 ½"	<u>7</u> "		
8" U.C.	2 <del>3</del> "	12 ¼"	, , ,	6 <u>l</u> "	<u>9</u> //		
10.67" U.C.	3 ¼"	14 ½"	4 3 "	7 ¼"	<u>5</u> "		
13.33" U.C.	3 <del>3</del> "	16 3/	5 <u>l</u> ''	8 <del>3</del> "	3 "		
16" U.C.	4 ½"	20"	6 <u>l</u> "	10"	7/8		
20" U.C.	5 ½"	$24\frac{1}{2}''$	7 ½"	11 ½"	1 ½"		

- \* FOR HORIZONTAL PLACEMENT UNDER LEGEND, DIMENSION "B" WILL BE EXTENDED, AT 1 FOOT INCREMENTS, TO APPROXIMATELY 50% OF THE MAXIMUM LEGEND WIDTH.
- \*\* FOR USE ON SIGNS WITH TYPE L-1 OR L-3 LEGENDS.



TYPE B

TYPE B ARROW TABLE							
LETTER SIZE	А	В	С	D	E	F	RG
8" - 10.67" U.C.	5 "	17"	3 3 "	7 <u>9</u> "	11 <u>9</u> "	1 5/16"	13" 16
13.33" U.C.	6 "	20"	4 ½"	9 🖁 "	14"	1 ½"	<u>3</u> //
16" U.C.	7 <u>l</u> "	25"	5 3 "	11 ½"	17"	1 3 "	1 "



TYPE C

TYPE C OVERHEAD ARROW DIMENSIONS								
А	В	С	D	Е	RF	RG		
6 ½"	22"	16"	16"	3 "	<u>3</u> //	1 "		

GENERAL NOTES:

ARROWS FOR REFERENCE ONLY.

ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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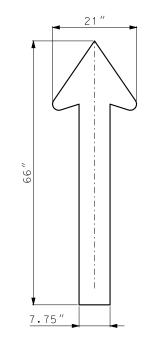


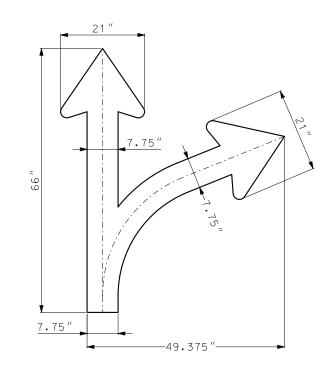
# STANDARD ARROW **DETAILS**

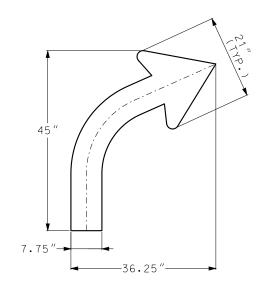
DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016

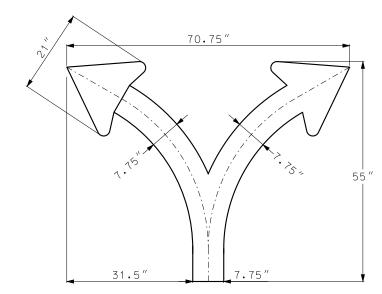
903.01J

SHEET NO. 1 OF 2

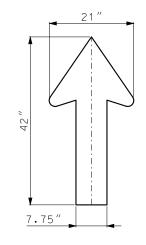


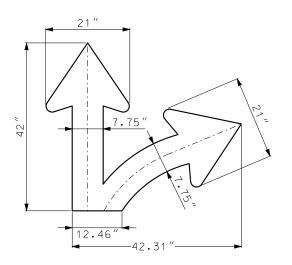


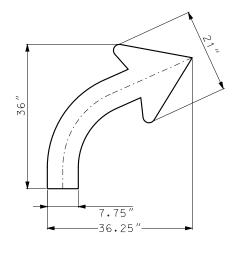


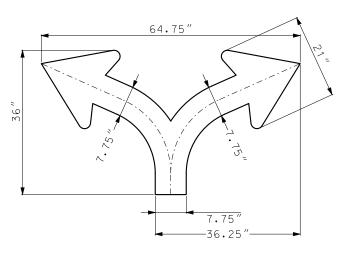


MUTCD ARROWS









# **MODOT ARROWS**

GENERAL NOTES:

ARROWS FOR REFERENCE ONLY.

ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.



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# STANDARD ARROW DETAILS

DATE PREPARED: 8/11/2016

DATE EFFECTIVE: 10/01/2016

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SHEET NO. 2 OF 2

# STRUCTURAL SIGN DATA

DESIGNATION	COL	OR SCHEME	SHEETING			
DESIGNATION	LEGEND	BACKGROUND	LEGEND	BACKGROUND		
STRUCTURAL (ST)	BLACK	WHITE	OPAQUE BLACK FILM	ASTM TYPE 4		
STRUCTURAL (ST)	WHITE	RED	ASTM TYPE 9 OR 11	ASTM TYPE 4		
	WHITE	GREEN	ASTM TYPE 9 OR 11	ASTM TYPE 4		
	WHITE	BLUE	ASTM TYPE 9 OR 11	ASTM TYPE 4		
	WHITE	BROWN	ASTM TYPE 9 OR 11	ASTM TYPE 4		
STRUCTURAL FLUORESCENT (STF)	BLACK	FL YELLOW	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11		
SINUCIUNAL FLUURESCENT (SIF)	BLACK	FL YELLOW GREEN	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11		
	BLACK	FL ORANGE	OPAQUE BLACK FILM	ASTM TYPE 9 OR 11		

NOTE: WHITE LEGEND IS DIRECT APPLIED UNLESS SPECIFIED OTHERWISE.

# FLAT SHEET SIGN DATA

DESIGNATION	COLO	OR SCHEME	SHEETING						
DESIGNATION	LEGEND	BACKGROUND	SHELLING						
FLAT SHEET (SH)	BLACK **	WHITE	ASTM TYPE 4 WHITE						
FLAI SHEEL (SH)	WHITE	BLACK **	ASTM TYPE 4 WHITE						
	RED	WHITE	ASTM TYPE 4 WHITE						
	WHITE	RED	ASTM TYPE 4 WHITE						
	WHITE	GREEN	ASTM TYPE 4 WHITE						
	GREEN	WHITE	ASTM TYPE 4 WHITE						
	WHITE	BLUE	ASTM TYPE 4 WHITE						
	WHITE	BROWN	ASTM TYPE 4 WHITE						
FLAT SHEET FLUORESCENT (SHF)	BLACK **	FL YELLOW	ASTM TYPE 9 OR 11 FL YELLOW						
FLAT SHEET FLOORESCENT (SHF)	BLACK **	FL YELLOW GREEN	ASTM TYPE 9 OR 11 FL YELLOW GREEN						
	BLACK **	FL ORANGE	ASTM TYPE 9 OR 11 FL ORANGE						

\*\* OPAQUE INK OR FILM

NOTE: LEGEND AND BACKGROUND COLORS ARE ACHIEVED THROUGH TRANSLUCENT INKS AND FILMS.

FLAT SHEET TI	HICKNESS
SIGN SIZE	THICKNESS
9 SF OR LESS	0.080 IN.
OVER 9 SF TO 16 SF	0.100 IN.
16 SF OR LARGER	0.125 IN.

GENERAL NOTES:

GROUND MOUNTED SIGNS GREATER THAN 5 FEET WIDE OR SIGNS GREATER THAN 30 SQUARE FEET SHALL BE STRUCTURAL.

ALL NON STANDARD SIGNS NOT FOUND IN THE MUTCD SHS MANUAL SHALL BE DETAILED BY THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING, SUBSTRATE AND FABRICATION DETAILS.

FOR MOUNTING DETAILS, SEE STANDARD PLANS 903.02.



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# HIGHWAY SIGNING

GENERAL SIGN DATA

DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019

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SHEET NO. 1 OF 8

## MODOT ID LABEL DETAILS

PLACED ON THE SIGN FACE

# WARNING

UP TO \$1,000 FINE AND 1 YEAR IMPRISONMENT FOR REMOVING OR TAMPERING WITH THIS SIGN

(1) USED ON SIGNS 9 SF AND LARGER



(1) USED ON SIGNS LESS THAN 9 SF

## VENDOR ID LABEL DETAILS

PLACED ON THE BACK OF THE SIGN

ACME SIGN COMPANY MIDWEST, US 55555 (800) 555-5555 SIGN FABRICATION DATE: JUNE 8, 2016

#### OPTIONAL

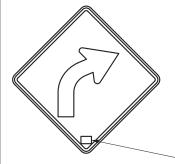
# ACME SIGN COMPANY MIDWEST. US 55555 (800) 555-5555 SIGN FABRICATION DATE 2 3 4 5 🜑 7 8 9 10 11 12 4 " (2)

#### OPTIONAL



SIGN FABRICATION DATE: JUNE 8, 2016 4 "

(3)

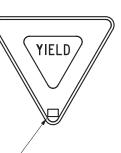




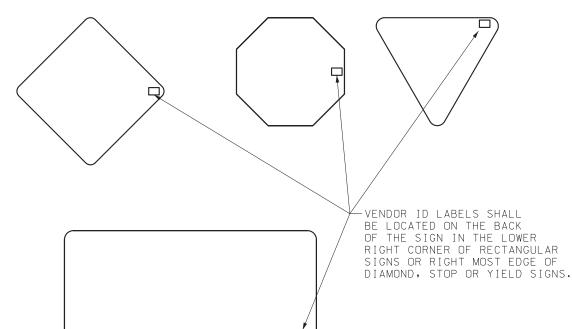
♠ Destination

□ Destination

**Destination** ⇒



MODOT ID LABELS SHALL BE LOCATED AT THE BOTTOM RIGHT CORNER OF ANY RECTANGULAR SIGN, IN THE BOTTOM POINT OF A DIAMOND OR YIELD SIGN AND AT THE LOWER RIGHT CORNER OF A STOP SIGN IN CLOSE PROXIMITY TO THE SIGN BORDER. AVOID BOLT HOLE LOCATIONS. (4)



(1) MODOT ID LABEL DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.

(2) TO FACILITATE MASS PRODUCTION OF LABELS, THE FABRICATION DATE MAY BE INDICATED BY DISPLAYING NUMBERS FOR MONTHS ALONG THE BOTTOM OF THE LABEL AND NUMBERS FOR YEARS ALONG THE RIGHT SIDE OF THE LABEL. THE FABRICATION DATE WOULD BE INDICATED BY HOLE PUNCHING THE APPROPRIATE NUMBERS (OR SOME EQUIVALENT PERMANENT METHOD TO BLOCK OUT OF THE NUMBERS) FOR THE MONTH AND YEAR BEFORE THE LABEL IS APPLIED TO

(3) INDIVIDUAL DECALS MAY BE USED TO DISPLAY THE VENDOR INFORMATION AND THE FABRICATION DATE. DECALS SHALL BE INSTALLED IN CLOSE VERTICAL PROXIMITY.

(4) THE MODOT ID LABEL MAY BE PLACED ON THE BACK OF THE SIGN ABOVE THE VENDOR ID LABEL IF THERE IS INSUFFICIENT SPACE AVAILABLE TO DISPLAY THE ID LABEL ON THE SIGN FACE WITHOUT INTERFERING WITH THE SIGN LEGEND OR BOARDER.

#### GENERAL NOTES:

ALL DECALS SHALL BE SILK SCREEN PRINTED WITH MATCHED COMPONENT INK AND SHEETING MATERIALS TO PROVIDE A LABEL THAT HAS AN EQUAL LIFE EXPECTANCY AS THE SIGN FACE.

MODOT ID LABELS SHALL BE PRINTED ON CLEAR ELECTROCUT FILM BACKGROUND WITH BLACK INK OR IT MAY BE INCORPORATED INTO THE SILK SCREEN DETAIL AND PRINTED ALONG WITH THE SIGN FACE. IF THE LABEL IS APPLIED IN THIS MANNER THE LEGEND OF THE LABEL SHALL MATCH THE COLOR OF THE SIGN LEGEND IT IS BEING APPLIED TO. THE LABEL SHALL NOT HAVE ANY BACKGROUND COLOR OR BORDER.

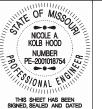
VENDOR ID LABEL SHALL CONTAIN THE COMPANY CONTACT INFORMATION (INCLUDING FULL NAME, CITY, STATE, PHONE NUMBER) AND THE SIGN FABRICATION DATE.

VENDOR ID LABEL SHALL BE PRINTED ON A WHITE BACKGROUND WITH BLACK INK AND THE LEGEND SHALL BE A MINIMUM OF 1/4".

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# HIGHWAY SIGNING

GENERAL SIGN DATA

DATE PREPARED:

7/18/2019

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SHEET NO. 2 OF 8

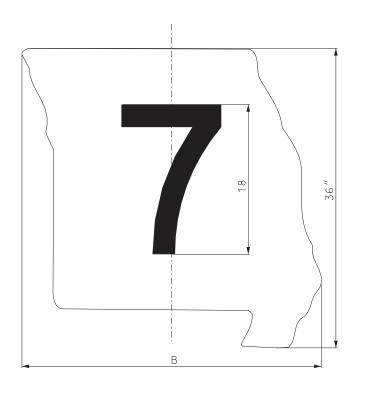
DATE EFFECTIVE: 10/01/2019

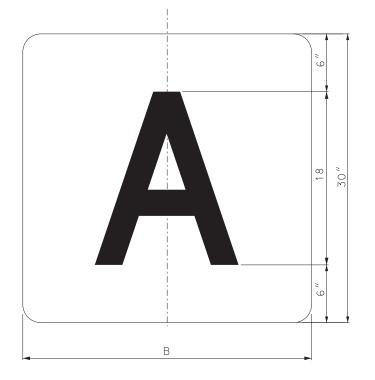
# STATE NUMBER ROUTE SHIELD GUIDE SIGN USE

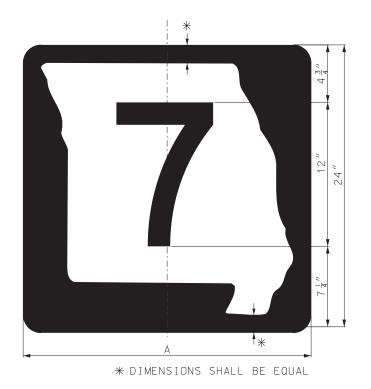
# STATE LETTER ROUTE SHIELD GUIDE SIGN USE

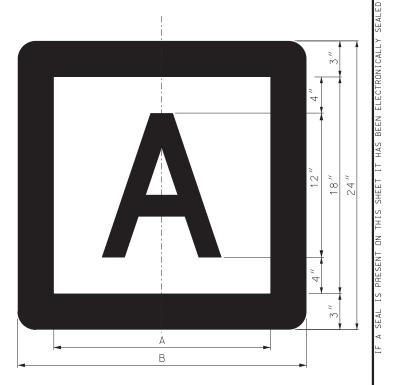
# STATE NUMBER ROUTE SHIELD INDEPENDENT USE

# STATE LETTER ROUTE SHIELD INDEPENDENT USE









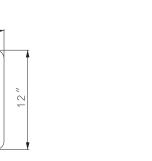
LOCATION	NO. OF	DIMEN (INC		LEGEND FONTS	
	LLTTLING	А	В	1 01113	
INDEPENDENT USE	1	18	24	D	
INDEPENDENT USE	2	24	30	D	
GUIDE SIGN USE	1	_	30	D	
GUIDE SIGN USE	2	_	36	D	

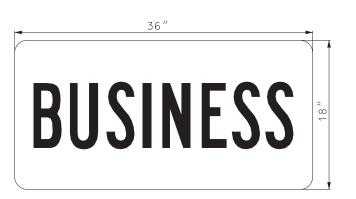
STATE LETTER ROUTE SHIELD

**BUSINESS** 

LOCATION	ROUTE NUMBER	DIMENSIONS (INCHES)		LEGEND FONTS	
	NOMBLIX	А	В	1 01113	
INDEPENDENT USE	1 & 2 DIGITS	24	24	D,C	
INDEPENDENT USE	3 DIGITS	30	30	D,C,B	
GUIDE SIGN USE	1 & 2 DIGITS	_	36	D,C	
GUIDE SIGN USE	3 DIGITS	_	45	D,C,B	

# STATE NUMBER ROUTE SHIELD





GENERAL NOTES:

REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING AND SUBSTRATE DETAILS.

FOR HOLE PUNCHING AND MOUNTING DETAILS SEE OTHER DRAWINGS.

FOR GENERAL SIGN DATA DETAILS SEE OTHER DRAWINGS.

THE MISSOURI SHAPE DETAIL MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

GUIDE SIGN USE SHALL BE DIRECT APPLIED. POST MOUNTED USE SHALL BE APPLIED TO ALUMINUM SUBSTRATE.

FOR NUMBERED ROUTES WITH MORE THAN 1 DIGIT THE LEGEND FONT MAY NEED TO BE REDUCED TO C OR B FONT.

SEE MUTCD SHS FOR DETAILS FOR US AND INTERSTATE ROUTE SHIELDS.

NON-STANDARD SHIELD SIZES MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.



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# HIGHWAY SIGNING

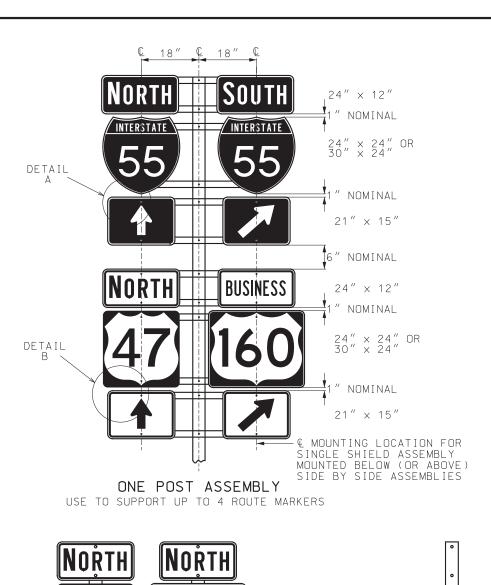
STANDARD SHIELDS FOR INDEPENDENT AND GUIDE SIGN USE

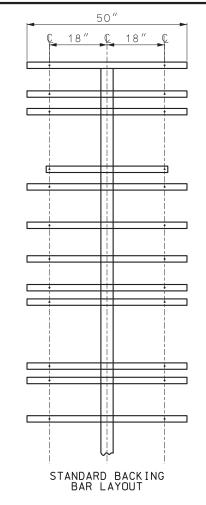
DATE EFFECTIVE: 10/01/2019 DATE PREPARED:

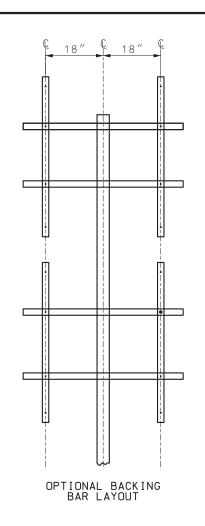
7/18/2019

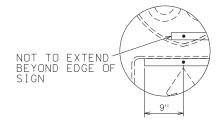
903.02AP

SHEET NO. 3 OF 8

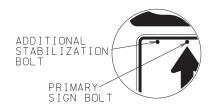








DETAIL A SEE GENERAL NOTES



DETAIL B SEE GENERAL NOTES

GENERAL NOTES:

ALL BACKING BARS SHALL BE 2"x  $\frac{3}{8}$ " STEEL, GALVANIZED AFTER PUNCHING. WEIGHT = 2.55 LBS. PER FOOT. HOLES IN BARS SHALL BE  $\frac{3}{8}$ " AND SHALL BE PUNCHED AS SHOWN ON THIS DRAWING.

DETAIL A - THE END OF THE HORIZONTAL BACKING BARS SHALL EXTEND MAXIMUM OF 9 INCHES PAST THE SIGN BOLT, BUT SHALL NOT EXTEND PAST THE EDGE OF THE SIGN.

DETAIL B - FOR SIGNS INSTALLED ON TWO PARALLEL HORIZONTAL BACKING BARS, ONE ADDITIONAL BOLT SHALL BE ADDED TO THE LEFT SIGN TO KEEP ASSEMBLY SQUARE.

WHEN USING OPTIONAL BACKING BAR LAYOUT, VERTICAL BARS SHALL BE MOUNTED BEHIND HORIZONTAL BARS.

BACKING BARS SHALL MEET MISSOURI STANDARD PLANS OR APPROVED PRODUCTS LIST.

BACKING BARS PAID FOR AS STRUCTURAL STEEL, PER POUND.

ALL SIGNS TO BE INSTALLED ALONG VERTICAL CENTERLINES.

FOR POST AND FOOTING DATA AND DETAILS OF SHIELDS AND PLAQUES, SEE OTHER DRAWINGS.

NOMINAL VERTICAL SPACING INDICATED BETWEEN SIGNS TO BE ACHIEVED BY USING THE CLOSEST AVAILABLE HOLES WHEN USING PSST.



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HIGHWAY SIGNING BACKING BARS

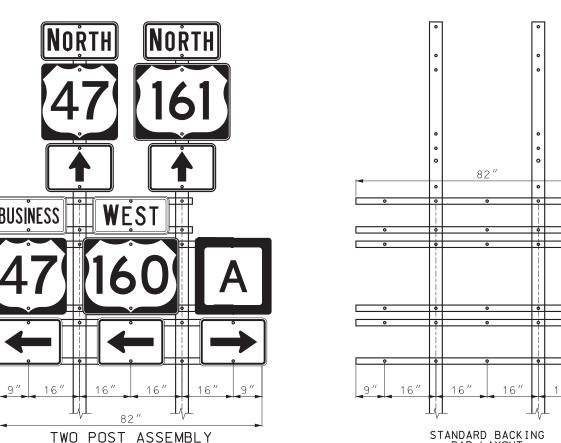
SHEET SIGN MOUNTING ROUTE SHIELD AND MARKER ASSEMBLIES

DATE EFFECTIVE: 10/01/2019 DATE PREPARED:

7/18/2019

903.02AP

SHEET NO. 4 OF 8



USE TO SUPPORT 5 OR 6 ROUTE MARKERS

BAR LAYOUT

TWO POST ASSEMBLY NOTE:

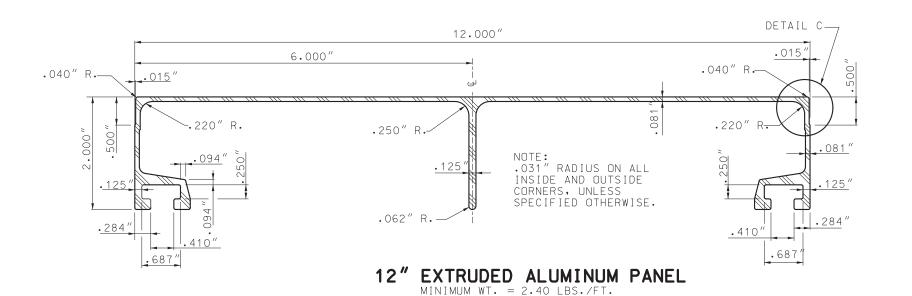
OPTIONAL BACKING BAR LAYOUT MAY BE USED WITH TWO POST ASSEMBLY.

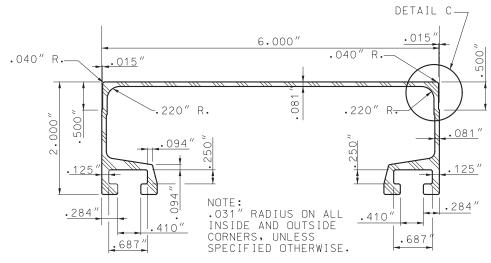
FOR 6 ROUTE SHIELD ASSEMBLY ADDITIONAL BACKING BARS ARE REQUIRED.

POST SELECTION

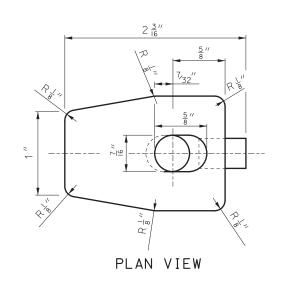
SINGLE POST ASSEMBLIES SHALL USE A 4" PIPE POST OR A  $2\frac{1}{2}$ " PSST POST.

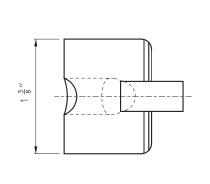
TWO POST ASSEMBLIES SHALL USE TWO 4" PIPE POSTS OR TWO  $2\frac{1}{2}$ " PSST POST WITH  $2\frac{1}{4}$ " PSST INSERTS AND BREAKAWAYS. (SEE ŠTANDARD PLAN 903.03)





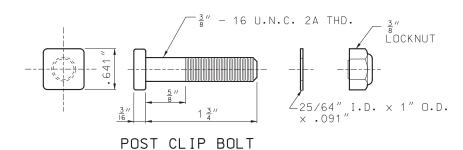
EXTRUDED ALUMINUM PANEL MINIMUM WT. = 2.40 LBS./FT.

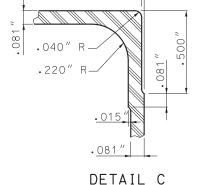




END VIEW

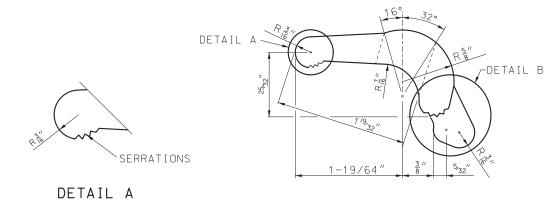
NOTE: MINIMUM WEIGHT AND THICKNESS DIMENSIONS SHOWN. HEAVIER PANELS MAY BE USED.

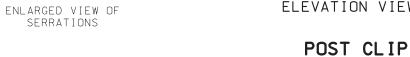




NOTE: SQUARE BOLT HEAD SHOWN. RECTANGULAR BOLT HEAD WITH LEAST DIMENSION OF .641" MAY

BOLT - 1 \(\frac{3}{4}\) \(\times\) \(\frac{3}{8}\) \(\text{ALUMINUM}\) \(\text{HEX LOCKNUT} - \(\frac{3}{8}\) \(\text{ALUMINUM}\) \(\text{WASHER} - \(\text{ALUMINUM}\)





**ELEVATION VIEW** 

POST CLIPS SHALL BE ASTM B 108, 356-T6 ALUMINUM ALLOY.

SERRATIONS

WITH FLAT WASHER AND LOCKNUT

DETAIL B ENLARGED DETAIL OF SERRATIONS

SAW GATING AS SHOWN (APPROXIMATELY FLAT PERMISSABLE)



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# HIGHWAY SIGNING EXTRUDED ALUMINUM PANEL

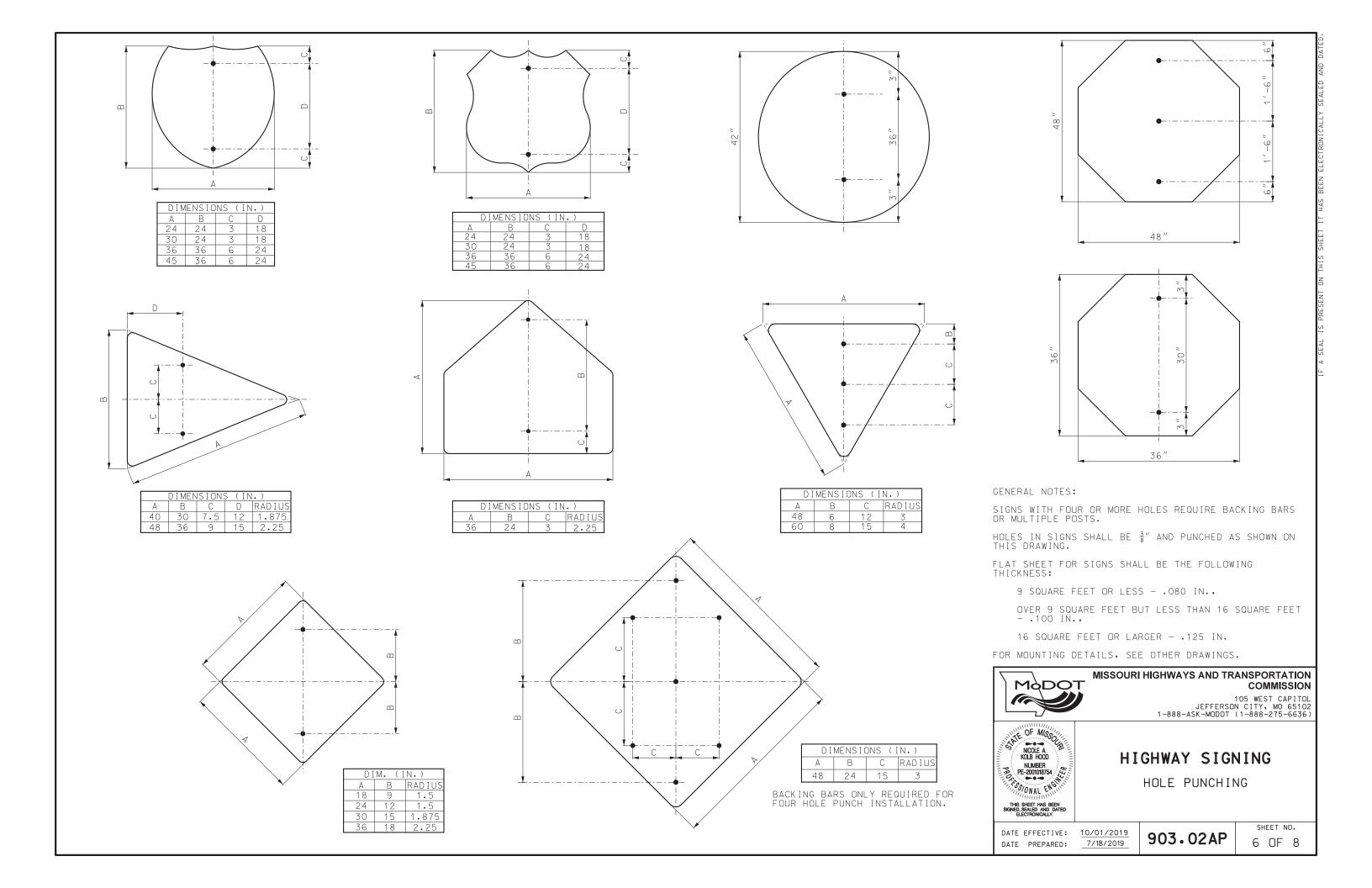
DETAILS

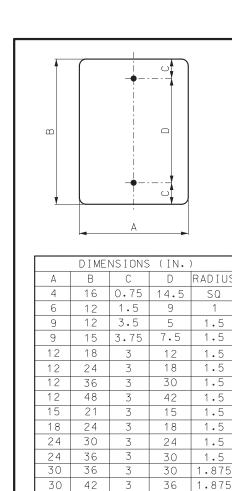
DATE PREPARED:

DATE EFFECTIVE: 10/01/2019 7/18/2019

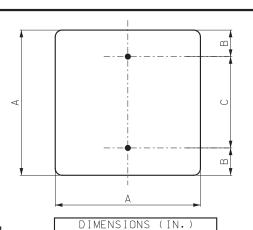
903.02AP

SHEET NO. 5 OF 8





30 48



18

9 1.5

12 1.5

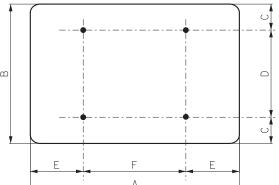
3 18 1.5 3 24 1.875 6 24 2.25

DIMENSIONS (IN.) B C RADIU

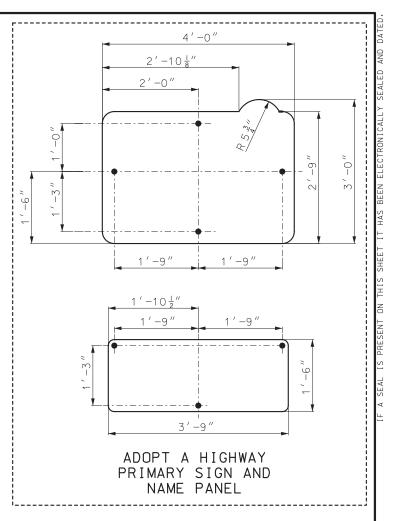
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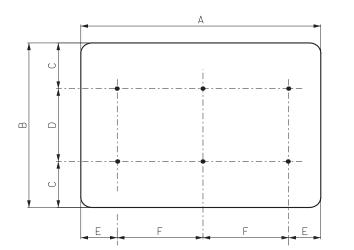
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	DIMEN	SIONS	(IN.)	
4 4	В	С	D	RADIUS
4	5	1.5	2 6	1.5
12	9	1.5		1.5
18	9	1.5	6	1.5
18	12	1.5	9	1.5
21	B 5 9 9 12 15	1.5 1.5 1.5 1.5 1.5	12	1.5
24	8 12 18	1.5	6 9 12 5 9	1.5
24	12	1.5	9	1.5
24	18	3	12	1.5
30	8	1.5	5	1.5
30	12	1.5	9	1.5
30	8 12 18 24 8 12 18 24 30 8	3	5 9 12 18	1.5
30	24	3	18	1.5
36	8	1.5	5	1.5
36	12	1.5	9	1.5
36	18	3	12	1.5
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42	30	3	24	1.875
12 18 18 21 24 24 30 30 30 30 36 36 36 36 42 42 42 42 42 48	36	1.5 1.5 1.5 1.5 1.5 1.5 1.5 3 1.5 1.5 3 3 1.5 1.5 3 3 1.5 1.5 3 3 3 1.5 1.5 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	30	2.25
48	8	1.5	24 30 5	1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5



		DIMEN	ISIONS	(IN.)	)	
А	В	С	D	E	F	RADIUS
48	12	1.5	9	9	30	1.5
48	18	1.5	15	9	30	1.5
48	24	3	18	9	30	1.5
48	30	3	24	9	30	1.875
48	36	6	24	9	30	2.25
54	18	1.5	15	9	36	1.5
60	12	1.5	9	12	36	1.5
60	18	1.5	15	12	36	1.5
60	24	3	18	12	36	1.5
60	30	3	24	12	36	1.875
60	36	6	24	12	36	2.25
60	48	6	36	12	36	3
72	36	6	24	12	48	2.25
72	48	6	36	12	48	3





*Z	32"
"2"	38"-36"-
7 " 2	50"-48"
1	<u> </u> +

BACKING BARS FOR SINGLE POST SIGNS

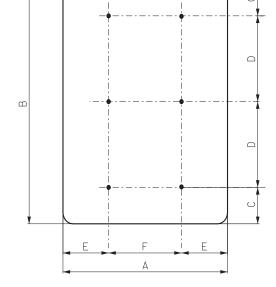
GENERAL NOTES:

REFER TO GENERAL NOTES ON SHEET 6 OF 8.

В		٥	
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¥		O,	<u></u>

36 1.875

	DIMEN	ISIONS	(IN.)	
Α	В	С	D	RADIU:
4	72	6	30	SQ
12	72	6	30	1.5
18	60	6	24	1.5
24	48	6	18	1.5
36	48	6	18	2.25
36	60	6	24	2.25
36	72	6	30	2.25



DIMENSIONS (IN.)										
Α	В	С	F	RADIUS						
48	60	6	24	9	30	3				
48	72	6	30	9	30	3				
48	84	6	36	9	30	3				
48	96	6	42	9	30	3				

DIMENSIONS (IN.)										
А	В	С	D	E	F	RADIUS				
84	24	3	18	12	30	3				
96	48	6	36	16	32	3				

DIMENSIONS (IN.) FOR SIGNS REQUIRING NO HOLE PUNCHING								
А	В	RADIUS						
66	18	1.5						
72	18	1.5						
78	18	1.5						
84	18	1.5						
90	18	1.5						
96	18	1.5						
36	78	2.25						



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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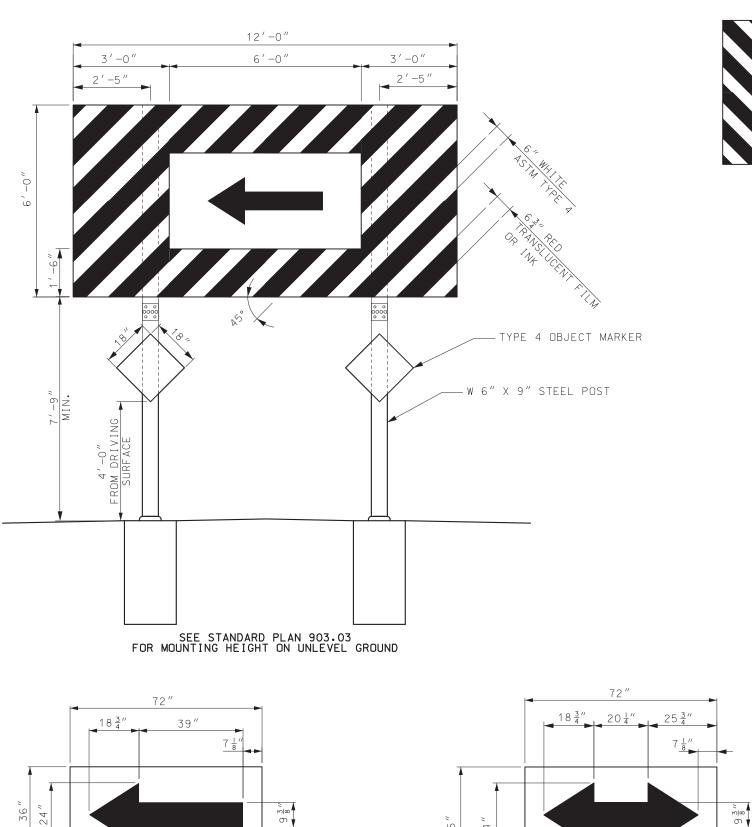
# HIGHWAY SIGNING

HOLE PUNCHING

DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019

903.02AP

SHEET NO. 7 OF 8



W1 - 7

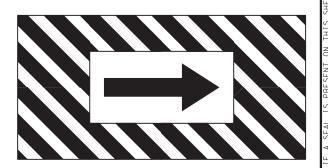
W1 - 6







T-INTERSECTION



GENERAL NOTES:

SEE STANDARD PLAN 903.03 FOR WIDE FLANGE INSTALLATION.

SIGN BARRICADE SHALL BE CONSTRUCTED AS A STRUCTURAL (ST) SIGN.

DIRECTIONAL ARROWS SHALL BE SHF AND CONSIDERED INCIDENTAL TO THE SIGN.

ALL REFLECTORIZED SURFACES SHALL BE RETROREFLECTIVE SHEETING IN ACCORDANCE WITH SEC 1042.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# HIGHWAY SIGNING

SIGN BARRICADE

DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019

903.02AP

SHEET NO. 8 OF 8

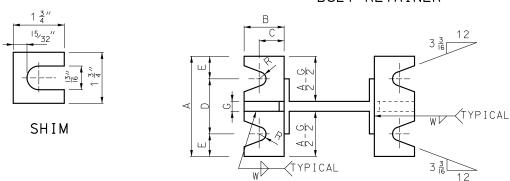
	STRUC	TUR.	AL ST	EEL I	POS	TF	OR G	RO	UND	MC	DUN	TED	S	I GN	S		
	POST		BOLT		W	ASHE	R	BASI	E CC	INNE	CTIO	N DA	ATA	TABL	_E (IN.)		
	NOM SIZE		LENGTH	TORQUE	OD	ID	THICK	А	В	С	D	F	F	G	w	R	
NO.	(IN.XLBS)	IN.	IN.	IN./LB.	IN.	IN.	IN.	A				-	Г	6	VV		
1	W6×9																
2	W6×15	<u>5</u>	$2\frac{3}{4}$	345	1 <del>5</del>	16 11	8	5	2	1 4	$2\frac{3}{4}$	1 🖠	<u>3</u>	1/2	1/4	<u>11</u> 32	ľ
3	W8×18																Ī
4	W10×22																
5	W10×26	<u>3</u>	3 <del>1</del>	555	1 <u>15</u> 32	<u>13</u> 16	<u> </u>	6	2 1/4	1 3/8	3 ½	1 🛓	1	<u>3</u>	<u>5</u> 16	13 32	
6	W12×35																

	POST AND FOOTING DATA TABLE																
	POST							F	TOOTI	NG							
POST DES.					WLIOIII				DIA.	LEV GROU		6 <b>:</b> 1 G	RADE	4:1 GF	RADE	3:1 O GRA	
NO.	JIZL	LBS/FT LBS/IN			DEPTH	С.Ү.	DEPTH	С.Ү.	DEPTH	С.Ү.	DEPTH	C.Y.					
1	W6	9.0	0.75	3′-0″	15"	3′-0″	0.14	3'-2"	0.15	3′-3″	0.16	3′-6″	0.17				
2	W6	15.0	1.25	4′-0″	24"	4′-0″		4'-2"	0.50	4'-3"	0.51	4′-6″	0.54				
3	W8	18.0	1.50	4′-6″	28"	4′-6″	0.71	4′-8″	0.73	4'-9"	0.74	5′-0″	0.78				
4	W10	22.0	1.83	5′-0″	36"	5′-0″	1.31	5′-2″	1.36	5′-3″	1.39	5′-6″	1.45				
5	W10	26.0	2.17	5′-0″	36"	5′-0″	1.31	5′-3″	1.37	5′-5″	1.43	5′-9″	1.52				
6	W12	35.0	2.92	5′-6″	36"	5′-6″	1.44	5′-9″	1.52	5′-11″	1.56	6′-3″	1.65				

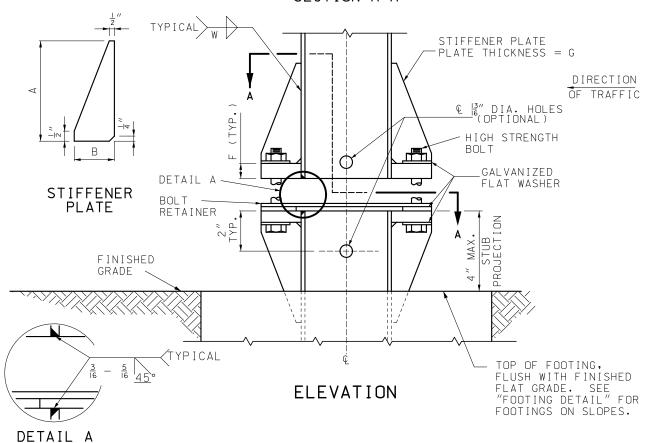
SHEET METAL BOLT RETAINER CUT FROM 30 GAGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES TO BE 16" LARGER THAN REQUIRED BOLT SIZE.

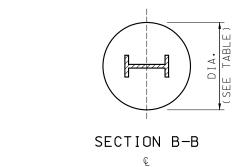


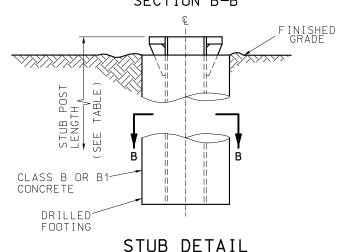
#### BOLT RETAINER

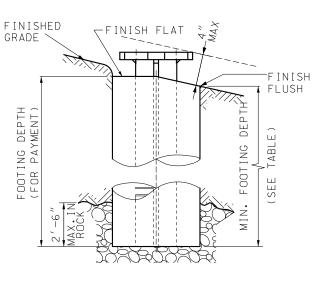


SECTION A-A









FOOTING DETAIL

GENERAL NOTES:

DESIGN SPECS: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS - 1985 (EXCEPT 2001 AND LATEST INTERIMS FOR STRUCTURAL STEEL POSTS).

POSTS, PERFORATED FUSE PLATE AND SPLICE PLATE TO BE GALVANIZED AFTER FABRICATION.

METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE ALLOWED.

REMOVE ALL GALVANIZING RUNS OR BEADS IN THE WASHER AREA.

ALL STRUCTURAL STEEL STIFFENER PLATES AND BASE PLATES, FOR GROUND MOUNTED SIGNS SHALL MEET THE REQUIREMENTS OF ASTM A 36 OR AASHTO M 270 GRADE 50, MINIMUM YIELD 50,000 PSI.

IN THE EVENT THE DISTANCE BETWEEN THE TOP OF THE FOOTING AND THE BOTTOM OF THE SIGN IS LESS THAN 7'-9". THE SIGN HEIGHT AND POST LENGTH IS TO BE INCREASED SUFFICIENTLY TO ACCOMMODATE THIS MINIMUM SPACING.

HINGE PLATES NOT REQUIRED ON SINGLE POST SIGNS OR ANY SIGNS USING PIPE POSTS.

NUTS ON HINGE PLATE BOLTS SHALL BE TIGHTENED TO THE REQUIRED MINIMUM BOLT TENSION VALUES SHOWN IN TABLE SEC. 1080 OF THE STANDARD SPECIFICATIONS.

THE NUT SHALL BE FREE RUNNING. IF THE NUT WILL NOT SPIN ON THE BOLT BECAUSE OF GALVANIZING IRREGULARITIES, A LUBRICANT SHALL BE APPLIED.

ALL BREAKAWAY ASSEMBLY BOLTS SHALL BE TIGHTENED IN A SYSTEMATIC MANNER TO THE PRESCRIBED TORQUE SHOWN ON THIS DRAWING.

EACH BREAKAWAY ASSEMBLY BOLT SHALL BE LOOSENED AND RE-TIGHTENED TO THE REQUIRED TORQUE IN THE SAME ORDER AS THE INITIAL TIGHTENING.

THE THREADS SHALL BE BURRED AT THE NUT USING A CENTER PUNCH TO PREVENT NUT FROM LOOSENING.

POST LENGTH QUANTITY SHOWN ON PLANS INCLUDES STUB.

1" X  $2\frac{1}{2}$ " HIGH STRENGTH BOLTS FOR PIPE POSTS SHALL BE OF THE DESIGNATION AASHTO M 164 OR ASTM A 449. ALL OTHER HIGH STRENGTH BOLTS SHALL BE OF THE DESIGNATION ASTM F3125 GRADE A325.

FURNISH TWO .012"± AND TWO .0032"± THICK SHIMS PER POST FROM BRASS SHIM STOCK OR STRIP, DESIGNATION ASTM B 36. SHIM AS REQUIRED TO PLUMB POST.

HIGH STRENGTH BOLTS WITH HEX NUT AND THREE WASHERS WITH EACH BOLT ARE TO BE GALVANIZED.

OPTIONAL HOLES (13" ROUND FOR "I" SHAPE POSTS AND 16" ROUND FOR PIPE POST BASE PLATES) AS SHOWN IN "ELE-VATIONS" ARE TO BE USED AS AID FOR GALVANIZING ONLY.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# POST INSTALLATION DETAILS

POST AND FOOTING DETAILS WIDE FLANGE (WF) POSTS

DATE EFFECTIVE: 07/01/2022 DATE PREPARED:

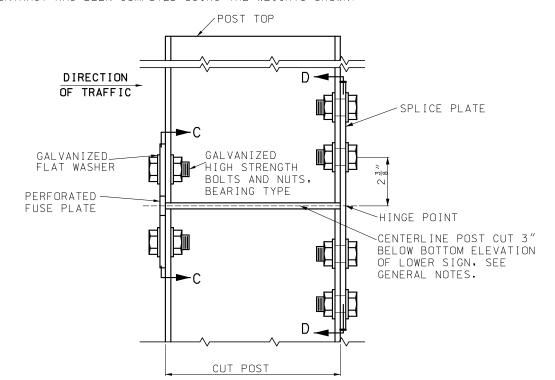
4/11/2022

903.03BP

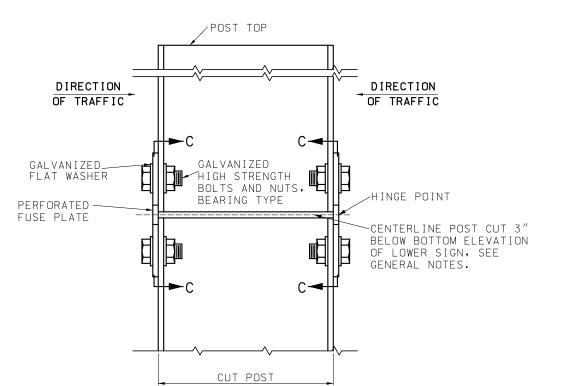
SHEET NO. 1 OF 16

WIDE	FLANGI	E STRU	CTURAL	STEEL	POSTS	DESIG	N DATA		PERFORATED FUSE PLATE DATA TABLE										SPLICE PLATE DATA TABLE								C L					
POST	NOM.	WE I	GHT			NGE	WEB	POST												BOLT	WT.	POST						BOLT	WT.	W	WASHER	?
DES. NO.	SIZE (IN.)	LB/FT	LB/IN	DEPTH (IN.)	WIDTH (IN.)	THICK (IN.)	THICK (IN.)	DESIGN NO.	(IN.)	G (IN.)	(IN.)	(IN.)	(IN.)	(IN.)	(IN.)	(IN.)	d1 (IN.)	d2 (IN.)	(IN.)	DIA. (IN.)	(EA.) (LBS.)	DESIGN NO.	(IN.)	(IN.)	(IN.)	(IN.)	d1 (IN.)	DIA. (IN.)	(EA.) (LBS.)	1 1	1 1	THICK IN.
1	W6	9	0.75	5 <del>7</del>	4	<u>3</u> 16	<u>3</u> 16	1	4 1/4	1	1 <del> </del>	4	2 1/4	<del>7</del> 8	1	1/2	<u>9</u> 16	<u>3</u>	<u>3</u> 16	1/2	0.76	1	4	2 1/4	7/8	<u>3</u> 16	<u>9</u> 16	1/2	2.45	1 3/16	<u>5</u> 8	1 8
2	W6	15	1.25	6	6	1/4	1/4	2	5	1 1/4	1 1/4	6	3 <del> </del>	1 1/4	1 ½	<u>3</u>	<u>     </u> 	1 1/4	1/4	<u>5</u>	1.67	2	6	3 <del>1</del> 2	1 1/4	1/4	11	<u>5</u> 8	4.89	1 5		
3	W8	18	1.50	8 1/8	5 ¼	<u>5</u> 16	1/4	3	5	1 1/4	1 1/4	5 🛓	2 <del>3</del> / <sub>4</sub>	1 1/4	1 <del> </del>	<u>3</u>	<u>II</u> 16	1 <del> </del>	1/4	5 8	1.51	3	5 🕌	2 <del>3</del> / <sub>4</sub>	1 <del> </del>	<u>5</u> 16	116	<u>5</u>	5.32	16	Ī6	8
4	W10	22	1.83	10	5 <del>3</del>	<u>3</u> 8	1/4	4	6	1 ½	1 ½	5 <del>3</del> 4	2 <del>3</del> 4	1 ½	1 <del>3</del> 8	<u>13</u> 16	<u>13</u> 16	1 <del> </del>	<u>5</u> 16	<u>3</u>	2.52	4	5 <del>3</del>	2 <del>3</del> / <sub>4</sub>	1 ½	<u>5</u> 16	<u>13</u> 16	<u>3</u>	5.75			
5	W10	26	2.17	103	5 <del>3</del>	7 16	1/4	5	6	1 ½	1 ½	5 <del>3</del>	2 <del>3</del> 4	1 ½	1 3/8	1 <u>3</u> 16	<u>13</u> 16	1 1/8	<u>5</u> 16	<u>3</u>	2.52	5	5 <del>3</del>	2 <del>3</del> 4	1 ½	<u>7</u> 16	<u>13</u> 16	<u>3</u>	8.04	1 15 1 32	<u>13</u> 16	<u> </u> 8
6	W12	35	2.92	12 ½	6 <u>1</u>	1/2	<u>5</u> 16	6	6	1 ½	1 1/2	6 <u>1</u>	3 ½	1 ½	1 5/8	<u>13</u> 16	13 16	1 5/16	<u>3</u> 8	3 4	3.35	6	6 ½	3 <del>1</del> / <sub>2</sub>	1 1/2	1/2	13 16	<u>3</u>	10.47			

THE WEIGHT OF STRUCTURAL STEEL POSTS SHOWN IN THE CONTRACT HAS BEEN COMPUTED USING THE WEIGHTS SHOWN.

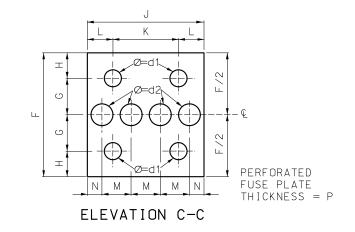


ONE DIRECTION BREAKAWAY



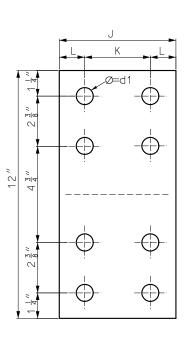
TWO DIRECTION BREAKAWAY

# PERFORATED FUSE PLATE AND SPLICE PLATE DETAIL



ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS. HOWEVER: FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND.

PERFORATED FUSE PLATE AND SPICE PLATE SHALL BE FABRICATED FROM ASTM A 36 STRUCTURAL STEEL.



SPLICE PLATE THICKNESS = U

ELEVATION D-D

#### NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR ROADWAYS WHERE TRAFFIC MAY STRIKE THE BACKSIDE OF THE POST, PERFORATED FUSE PLATES SHALL BE INSTALLED ON BOTH SIDES OF THE POST.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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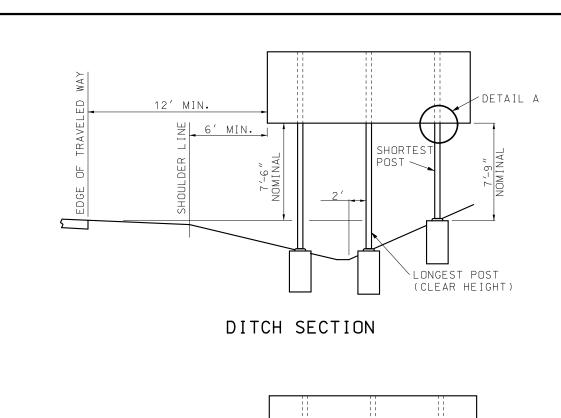
# POST INSTALLATION DETAILS

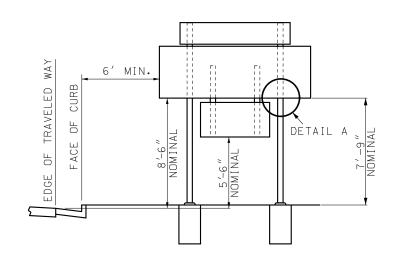
HINGE DETAILS WIDE FLANGE (WF) POSTS

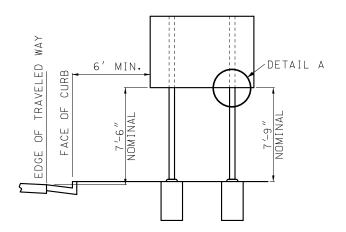
DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 4/11/2022

903.03BP

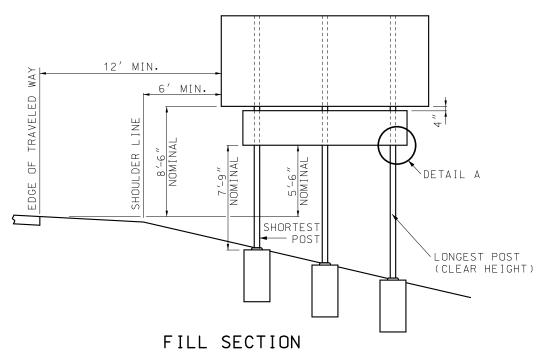
SHEET NO. 2 OF 16



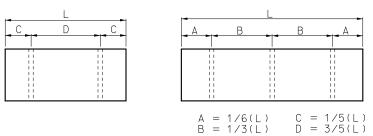




BARRIER CURB SECTIONS



TRAVELED WAY



POST SPACING

FOR POST DESIGNS NUMBERS 3, 4, 5 AND 6 HAVING WEIGHTS GREATER THAN 18LBS./FT., POSTS SHALL BE SPACED AT LEAST 7' APART.

FOR POST DESIGNS NUMBERS 1 AND 2, POSTS MAY BE SPACED LESS THAN 7' APART.

DO NOT USE THREE NUMBER 1 OR 2 POSTS FOR L LESS THAN 11'.

FOR L GREATER THAN 11' AND LESS THAN 17', 3 POSTS MAY BE USED DEPENDING ON SOIL CONDITIONS.

FOR L OF 6' TO 17' TYPICALLY USE 2 POSTS.

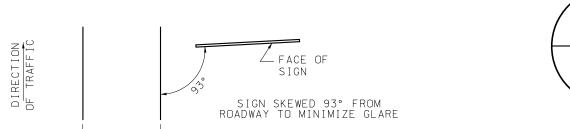
FOR L GREATER THAN 17' TYPICALLY USE 3 POSTS.

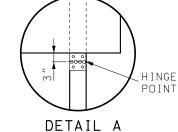
GENERAL NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 7'9" MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

POST SIZE IS DETERMINED USING SIGN HEIGHT, SIGN WIDTH AND CLEAR HEIGHT. THE CLEAR HEIGHT IS EQUAL TO THE LENGTH OF THE LONGEST POST MEASURED FROM THE GROUND TO THE BOTTOM OF THE SIGN.



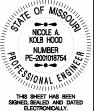


NOTE: SEE SHEET 2 FOR FUSE PLATE DETAILS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# POST INSTALLATION DETAILS

TYPICAL SECTION, MOUNTING HEIGHT AND POST SPACING WIDE FLANGE (WF) POSTS

DATE PREPARED:

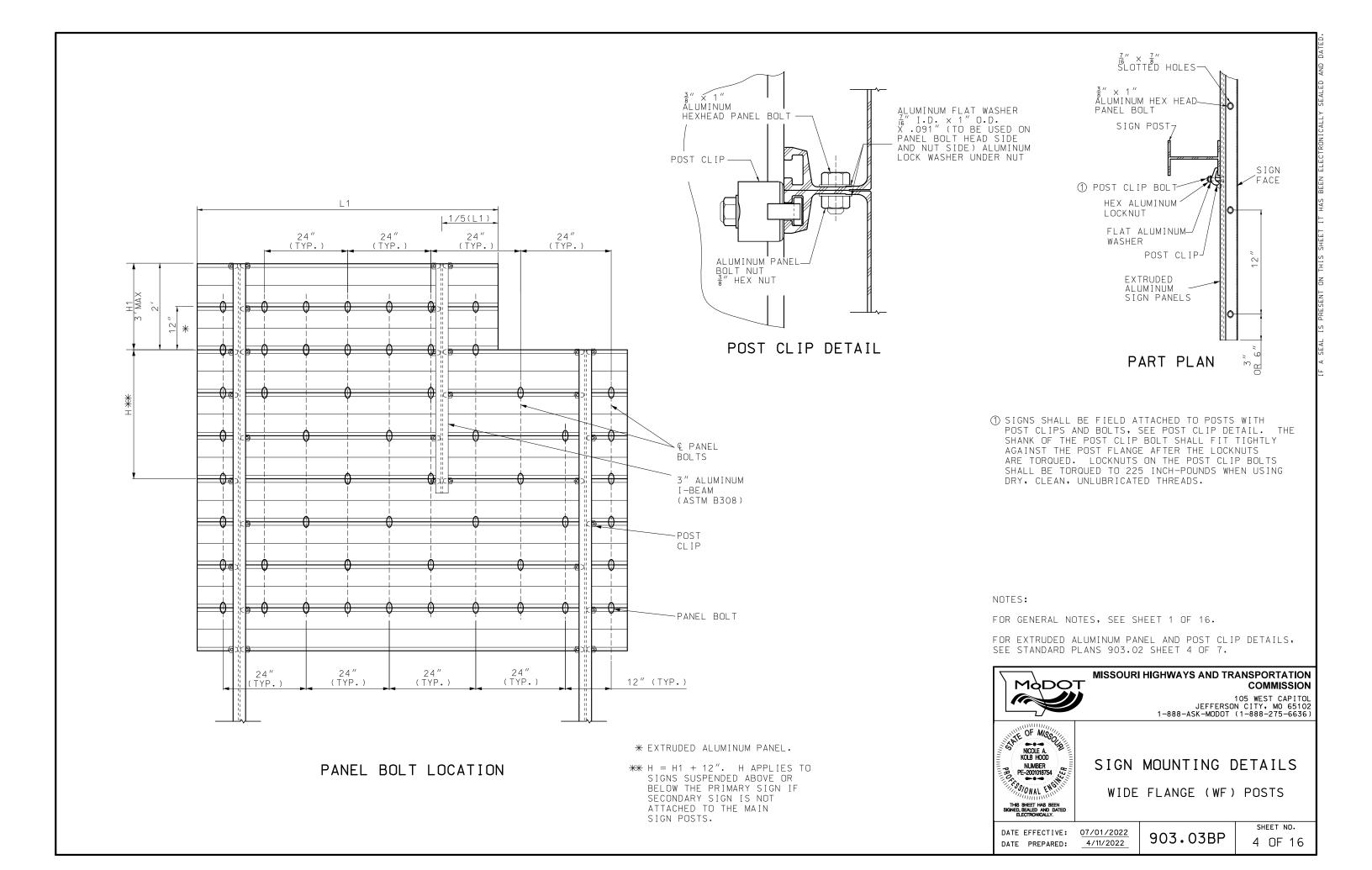
DATE EFFECTIVE: 07/01/2022 4/11/2022

903.03BP

SHEET NO. 3 OF 16

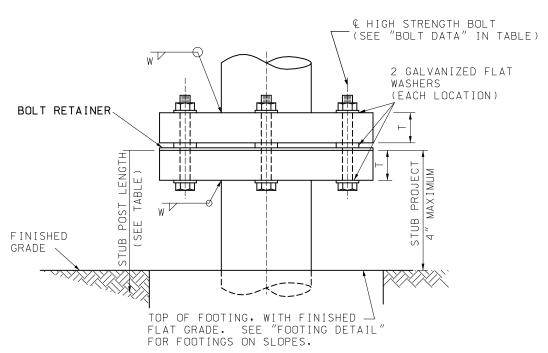
SIGN ORIENTATION

SHOULDER

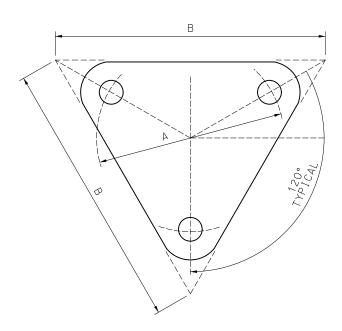


R	ROUND PIPE POST FOR GROUND MOUNTED SIGNS													
POST	BOLT		W	ASHE	R	BASE CONNECTION DATA TABLE (I								
NOM SIZE	DIA	LENGTH	TORQUE	OD	ID	THICK	A	В	С	R	_	w		
(INID)	IN.	IN. IN./LB.		IN.	IN.	IN.	l A	D		П		VV		
2 ½ 3	1/2	3 <u>1</u>	140	1 1/16	17,32	18	6 <del> </del>	9	1/4	9/32	1	1/4		
4	<u>5</u> 8	3 <del>3</del>	345	1 1 16	<u>  </u>  6	1/8	7 <del>3</del>	10	1/4	<u>3</u> 8	1	<u>5</u> 16		

	ROUN	D PIPE	POST	AND FOO	AND FOOTING DATA TABLE									
	NOM. SIZE	WEI	GHT	STUB LENGTH	FOC	TING	CONCRETE							
	(IN.)	LBS/FT	LBS/IN	LENGIN	DIA.	DEPTH	C.Y.							
ſ	2 ½	5.79	0.48	4'- 3½"	12"	4′-6″	0.13							
ſ	3	7.58	0.63	4'- 3½"	12"	4′-6″	0.13							
	4	10.79	0.90	5'- 3½"	18"	5′-6″	0.36							

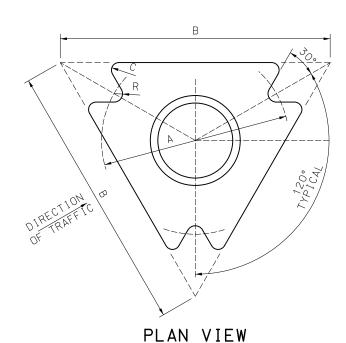


ELEVATION (STEEL PIPE POST BASE CONNECTION) MULTI-DIRECTION SLIP BASE

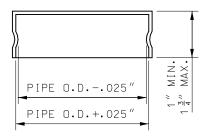


# BOLT RETAINER

SHEET METAL BOLT RETAINER CUT FROM 30 GAUGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES SHALL BE  $\frac{1}{16}$ " LARGER THAN REQUIRED BOLT SIZE.



ROLLED CRIMP TO ENGAGE PIPE O.D.

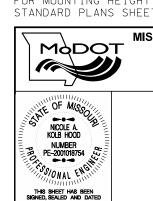


FRICTION CAP

#### NOTE:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE STANDARD PLANS SHEET 10 OF 16.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

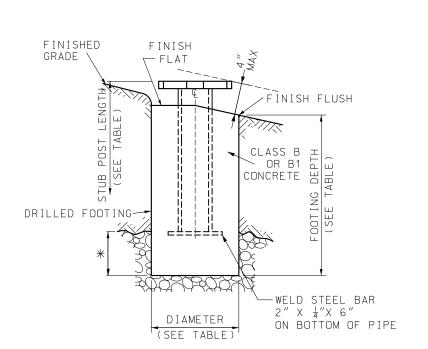
# POST INSTALLATION DETAILS

PIPE POST

DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 4/11/2022

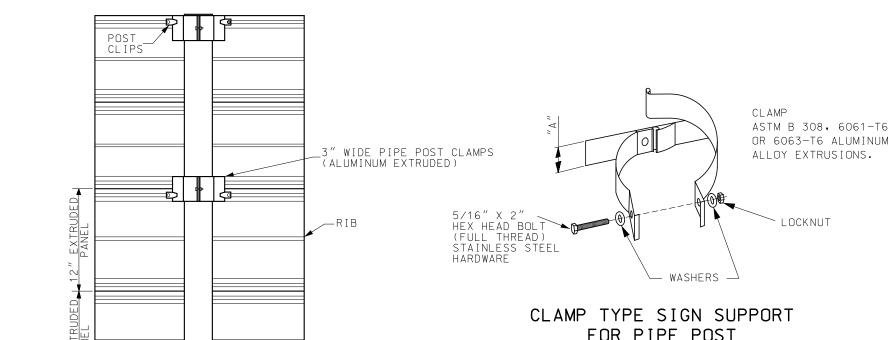
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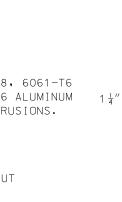
SHEET NO. 5 OF 16

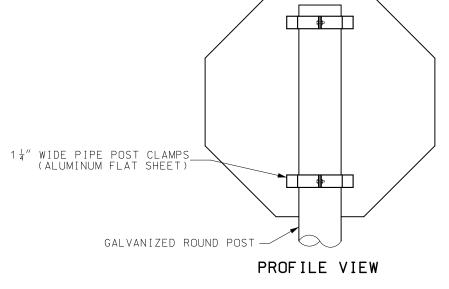


# FOOTING DETAIL

\* PIPE 3" DIA. AND UNDER: 2' MAXIMUM IN ROCK, PIPE OVER 3" DIA.; 3' MAXIMUM IN ROCK

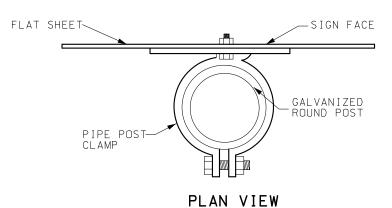




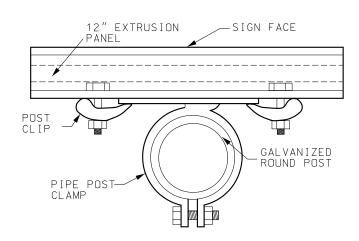


FOR PIPE POST

WIDTH OF PIP	E POST CLAMP
SIGN TYPE	MINIMUM "A"
FLAT	1 ¼"
STRUCTURAL	3 "



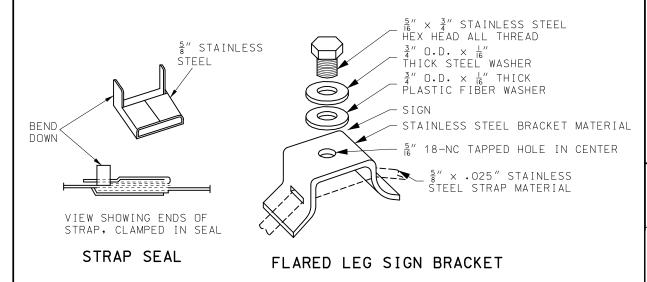
PROFILE VIEW



GALVANIZED ROUND POST

PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON PIPE POST



MOUNTING DETAILS FOR FLAT SHEET SIGNS ON ROUND STRUCTURES >4" PIPE POST

# MOUNTING DETAILS FOR FLAT SHEET ON PIPE POST

NOTES:

FOR GENERAL NOTES, SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

FOR DETAILS OF EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.



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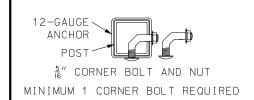


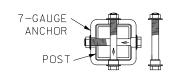
# SIGN MOUNTING DETAILS PIPE POST

DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 4/11/2022

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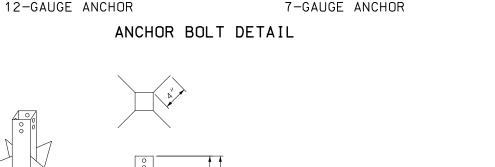
SHEET NO. 6 OF 16

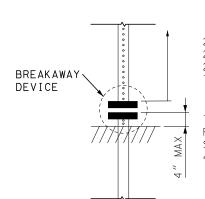




흥" x 3.5" SHOULDER BOLT AND NUT 2 SHOULDER BOLTS REQUIRED, INSTALLED PERPENDICULAR TO EACH OTHER

7-GAUGE ANCHOR





2.5" + 2.25" POST COMPRISED OF 2.5" PSST WITH 6-FT INSERT OF 2.25" PSST THAT RUNS UP FROM THE BREAKAWAY DEVICE

BOLT HOLE DIAMETER - 17/32

2 PER SIDE ON ALL 4 SIDES 7-GAUGE ANCHOR FABRICATION DETAIL

FOR 2.5" POST

FOR 2" POST

THE BREAKAWAY DEVICE PORTION FIXED TO THE GROUND ANCHOR SHALL BE NO HIGHER THAN 4" ABOVE THE FINISHED GRADE

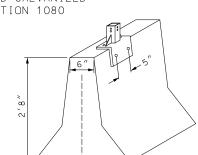
BREAKAWAY AND 2.5" + 2.25" POST DETAIL

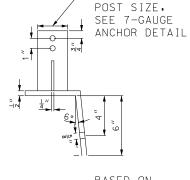
ANCHOR TUBE SHALL BE 7-GAUGE

1/2" X 4 1/2"GALVANIZED MECHANICAL FASTENERS SHALL BE USED TO ATTACH ANCHOR TO BARRIER WALL

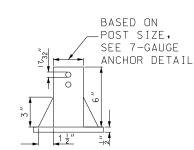
SHOULDER BOLTS SHALL BE USED TO ATTACH PSST POST TO ANCHOR (SEE ANCHOR BOLT DETAIL)

ANCHOR SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION PER SECTION 1080





BASED ON



#### BARRIER WALL MOUNTING DETAIL

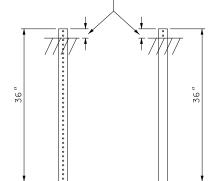
	POST AND ANCHOR DATA TABLE														
	POST		ANCHOR	BREAKAWAY REQUIRED											
	FU3 I		ANCHUR	NUMBER OF POSTS											
GAUGE	SIZE	GAUGE	DIMENSIONS	1	2	3									
12	2" × 2"	12	2.25" × 2.25" × 36"	NO	NO	YES									
12	2	7 <del>*</del>	2.5" × 2.5" × 36"	NO	NO	YES									
12	2.5" × 2.5"	7	3" × 3" × 36"	NO	YES	YES									
12	(2.5"x2.5")+(2.25"x2.25")	7	3" × 3" × 36"	YES	YES	YES									

\* TO BE USED WITH CONCRETE FOOTINGS OR IS AN OPTION IN ROCKY SOIL CONDITIONS

#### THE ANCHOR SHOULD BE A MAXIMUM OF 2.5" ABOVE THE GROUND LEVEL

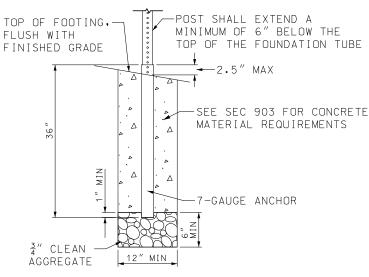
12-GAUGE (NOT SHOWN) OR 7-GAUGE

OMNIDIRECTIONAL/STABILIZED DRIVEN ANCHOR DETAIL

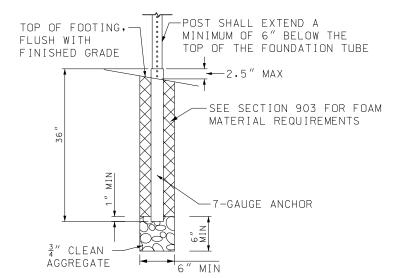


12-GAUGE 7-GAUGE

DRIVEN ANCHOR INSTALLATION DETAIL



CONCRETE FOOTING DETAIL



POLYURETHANE FOAM FOOTING DETAIL

#### NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

ALL BREAKAWAY DEVICES USED ON AN INSTALLATION SHALL BE CERTIFIED NCHRP 350 COMPLIANT.

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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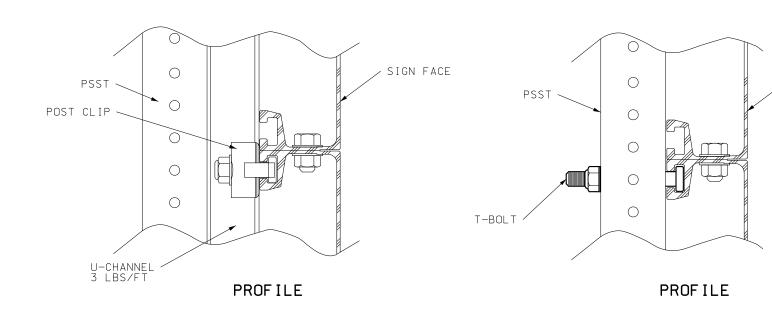
POST INSTALLATION DETAILS PERFORATED SQUARE STEEL TUBE (PSST)

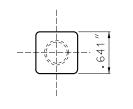
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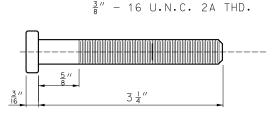
DATE EFFECTIVE: 07/01/2022 4/12/2022

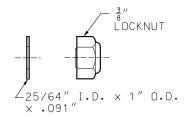
903.03BP

SHEET NO. 7 OF 16



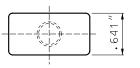






SIGN FACE

SQUARE BOLT HEAD SHOWN MAY BE REPLACED WITH RECTANGULAR BOLT HEAD WITH THE NARROW DIMENSION EQUAL TO .641".

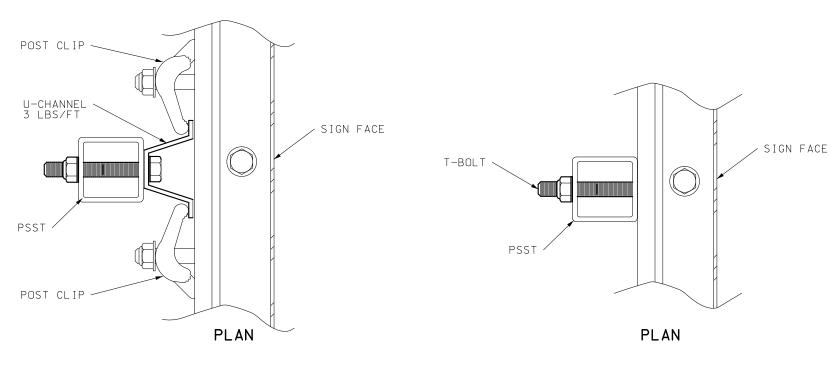


BOLT -  $1\frac{3}{4} \times \frac{3}{8}$  ALUMINUM BOLT -  $3\frac{1}{4} \times \frac{3}{8}$  ALUMINUM HEX LOCKNUT -  $\frac{3}{8}$ " ALUMINUM WASHER - ALUMINUM

# T-BOLT DETAIL

NOTES: — ALUMINUM BOLTS SHALL BE ASTM B 211, 2024—T4 OR 6061—T6
— ALUMINUM FLAT WASHERS SHALL BE ASTM B 209, ALCLAD 2024—T4 OR 2024—T4

- ALUMINUM LOCK NUTS (NYLON INSERT) SHALL BE ASTM B 211 OR 2017-T4



POST CLIP METHOD

T-BOLT METHOD

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO PSST POST NO. OF BOLTS PER SIGN HEIGHT PSST POST USED 2′ 3 3 ′ 4 4 ′ 5 5′ 6 6′

NOTES:

FOR THE GENERAL NOTES, SEE SHEET 1 OF 16.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

ALTERNATE PSST MOUNTING HARDWARE USE SHALL BE ON APPROVED LIST.



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SIGN MOUNTING DETAILS PERFORATED SQUARE STEEL TUBE (PSST)

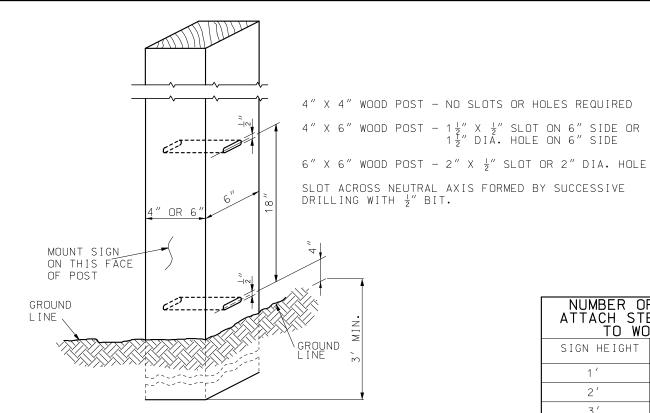
DATE PREPARED: 4/11/2022

DATE EFFECTIVE: 07/01/2022

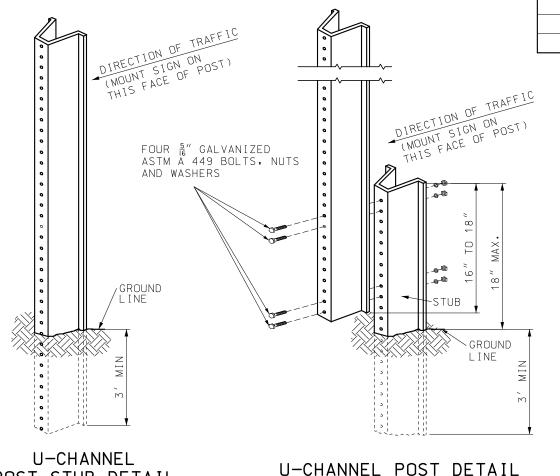
903.03BP

SHEET NO. 8 OF 16

EXTRUDED PANEL MOUNTING DETAIL

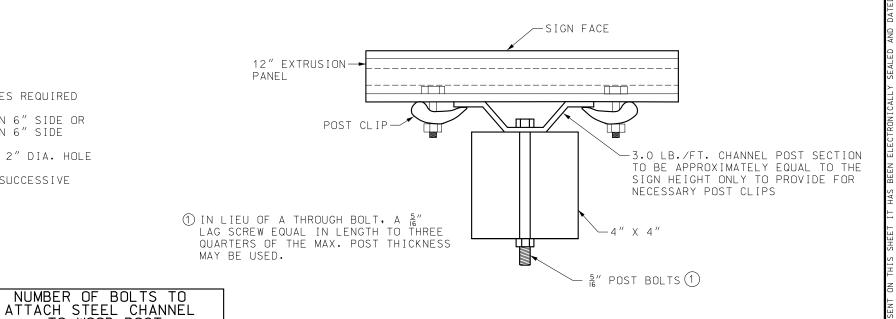


WOOD POST DETAIL



OPTIONAL INSTALLATION

POST-STUB DETAIL



#### TO WOOD POST SIGN HEIGHT | NO. OF BOLTS PER WOOD POST USED 2 2' 3

4 4 ′ 5 5′ 6 6′ 7 8

#### PLAN VIEW

# MOUNTING DETAILS FOR EXTRUDED PANELS ON WOOD POST

#### NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET INTO THE GROUND.

U-CHANNEL POST-STUB OVERLAP SHALL BE POSITIONED ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

FOR POST SIZING SEE ENGINEERING POLICY GUIDE.

FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

	POST TYPE										
SIGN AREA (SQ.FT.)	U-CHANNEL	WOOD									
≤ 10	1 - 3.0 LB./FT.*	1 - 4" X 4"*									
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4" 1 - 4" X 6" <del>*</del>									
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"									
> 24 ≤ 30	3 - 3.0 LB./FT.	2 - 4" X 6"									
> 30 ≤ 50	N/A	2 - 6" X 6"									

DOOT TWDE

# POST SIZE REQUIREMENTS



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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# SIGN MOUNTING DETAILS WOOD AND U-CHANNEL POST

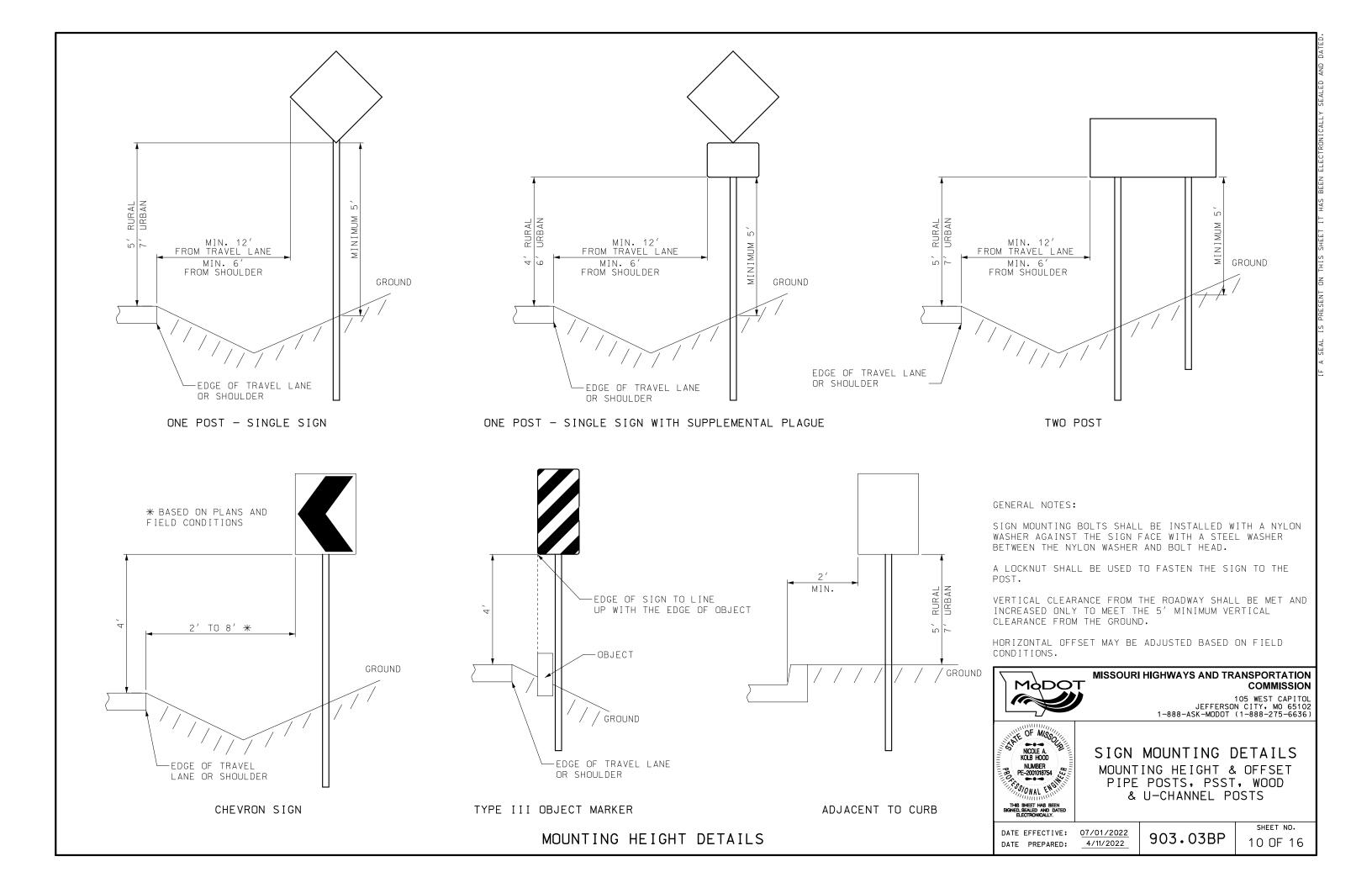
DATE EFFECTIVE: 07/01/2022 DATE PREPARED:

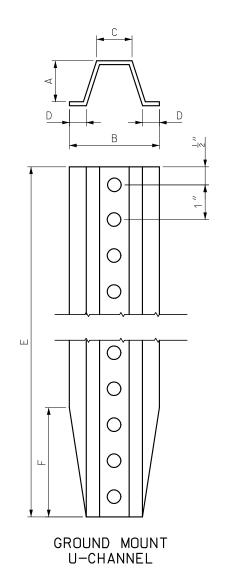
4/11/2022

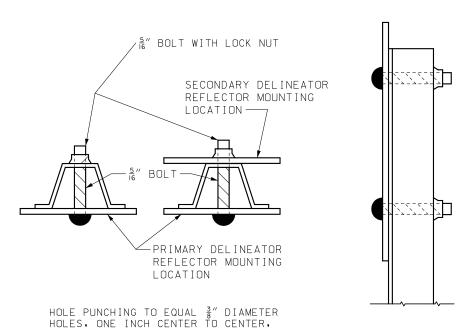
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SHEET NO. 9 OF 16

<sup>\*</sup> SIGNS GREATER THAN 4 FEET IN WIDTH REQUIRE TWO POSTS, EXCEPT DIAMOND SHAPED WARNING SIGNS, YIELD SIGNS, AND ONE WAY SIGNS.







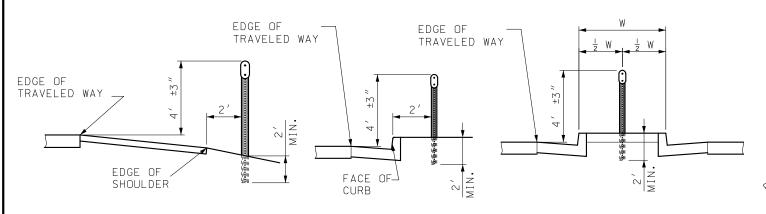
	CHANNEL POST DELINEATOR														
LIMITS	LBS/FT		DII	MENSION	S - INC	HES									
LIMITS	(2)	А	В	С	D	E	F								
NOMINAL	1.12	1	2 1/4	7 8	<u>3</u> 8	84	1								
TOLERANCE	± 5%	± 1/8	± 1/8	± 1/8	± ½	±1	± 1/4								

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING.

BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF

THE CHANNEL POST FOR DELINEATORS SHALL BE MANUFACTURED FROM DUCTILE ASTM A 36 OR ASTM A 1011 GR 60.

# CHANNEL POST DELINEATOR AND FASTENER DETAILS

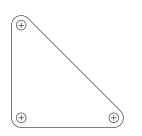


SHOULDER MOUNTED

OUTSIDE BARRIER CURB

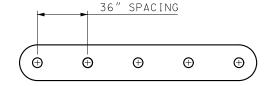
**NARROW** PAVED MEDIAN

CHANNEL POST DELINEATOR MOUNTING DETAILS

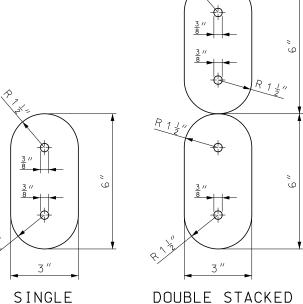


DELINEATOR PLACEMENT LOCATED AT THE RADIUS POINTS

# TUBULAR DELINEATOR PLACEMENT FOR ISLANDS

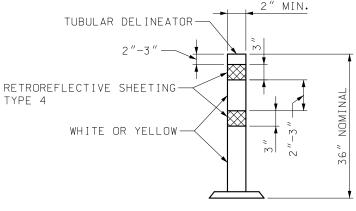


DELINEATOR PLACEMENT FOR MEDIAN STRIPS



SINGLE

CHANNEL POST DELINEATOR REFLECTOR



# 36 INCH SURFACE-MOUNT DELINEATOR POST TUBULAR DELINEATOR DETAIL

COLOR OF TUBULAR DELINEATOR AND REFLECTIVE SHEETING SHALL MATCH THE COLOR OF THE CLOSEST PAVEMENT MARKING OR CURB MARKING.

TUBULAR DELINEATOR SHAPE MAY BE ROUND OR T-SHAPED. TUBULAR DELINEATOR SHALL BE PERMANENTLY MOUNTED TO THE PAVEMENT SURFACE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

#### NOTES:

RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D4956 TYPE 9 OR 11 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7.5 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT

 $3\,^{\prime\prime}$  X  $6\,^{\prime\prime}$  delineator body shall be made from 0.080 inch aluminum.



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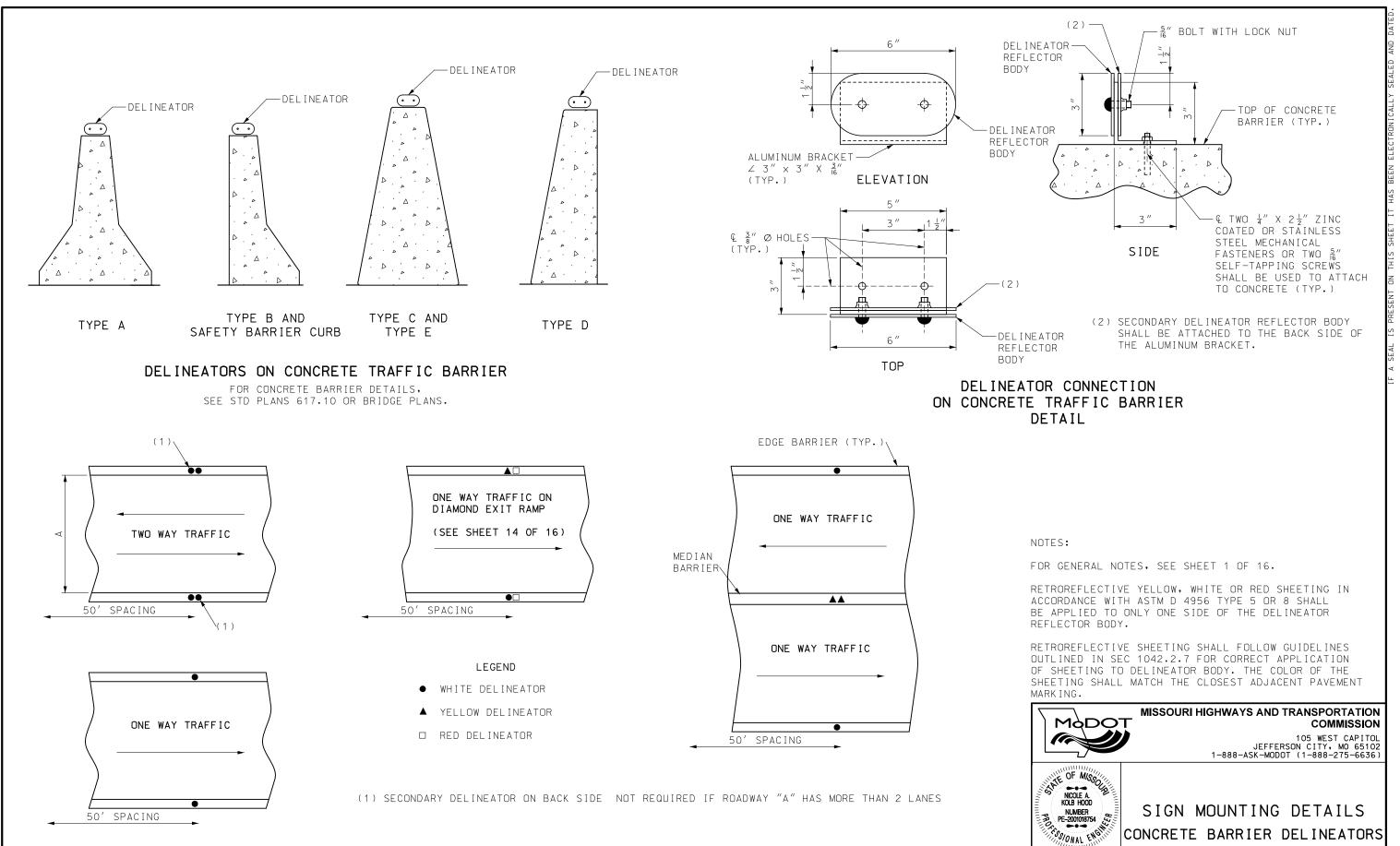
# SIGN MOUNTING DETAILS **DELINEATORS**

DATE EFFECTIVE: 07/01/2022 DATE PREPARED:

4/11/2022

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SHEET NO. 11 OF 16



ROADWAY OR BRIDGE CONCRETE TRAFFIC BARRIER DELINEATION

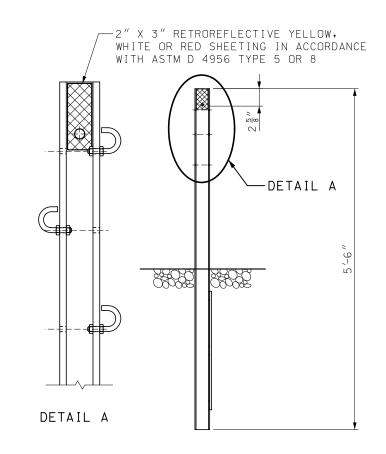
CONCRETE BARRIER DELINEATORS

DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 4/11/2022

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

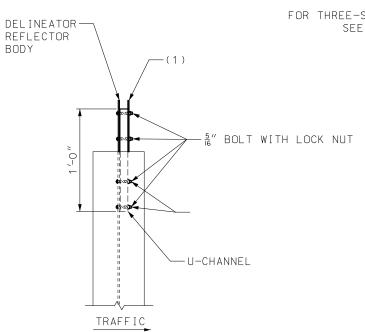
903.03BP

SHEET NO. 12 OF 16



# DELINEATORS ON THREE-STRAND MEDIAN GUARD CABLE

FOR THREE-STRAND GUARD CABLE DETAILS SEE STD PLANS 606.41.



#### DELINEATORS ON GUARDRAIL

BODY

HIGH

|||0|||

HollI 

-POST

POST

-DELINEATOR

REFLECTOR

DELINEATOR-REFLECTOR

BODY

GUARDRAIL

GUARDRAIL

BLOCK.

FOR GUARDRAIL DETAILS, SEE STD PLANS 606.00 AND 606.50.

(1) A SECONDARY DELINEATOR WITH RED SHEETING SHALL BE ATTACHED TO THE BACK SIDE OF THE CHANNEL WHEN THE DELINEATION IS PLACED ALONG AN INTERCHANGE RAMP AND COULD BE VIEWED BY WRONG WAY TRAFFIC.

#### NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D 4956 TYPE 5 OR 8 SHALL BE APPLIED TO ONLY ONE SIDE OF THE CHANNEL POST DELINEATOR MOUNTED TOWARDS THE CHANNEL POST.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.

# MODOT

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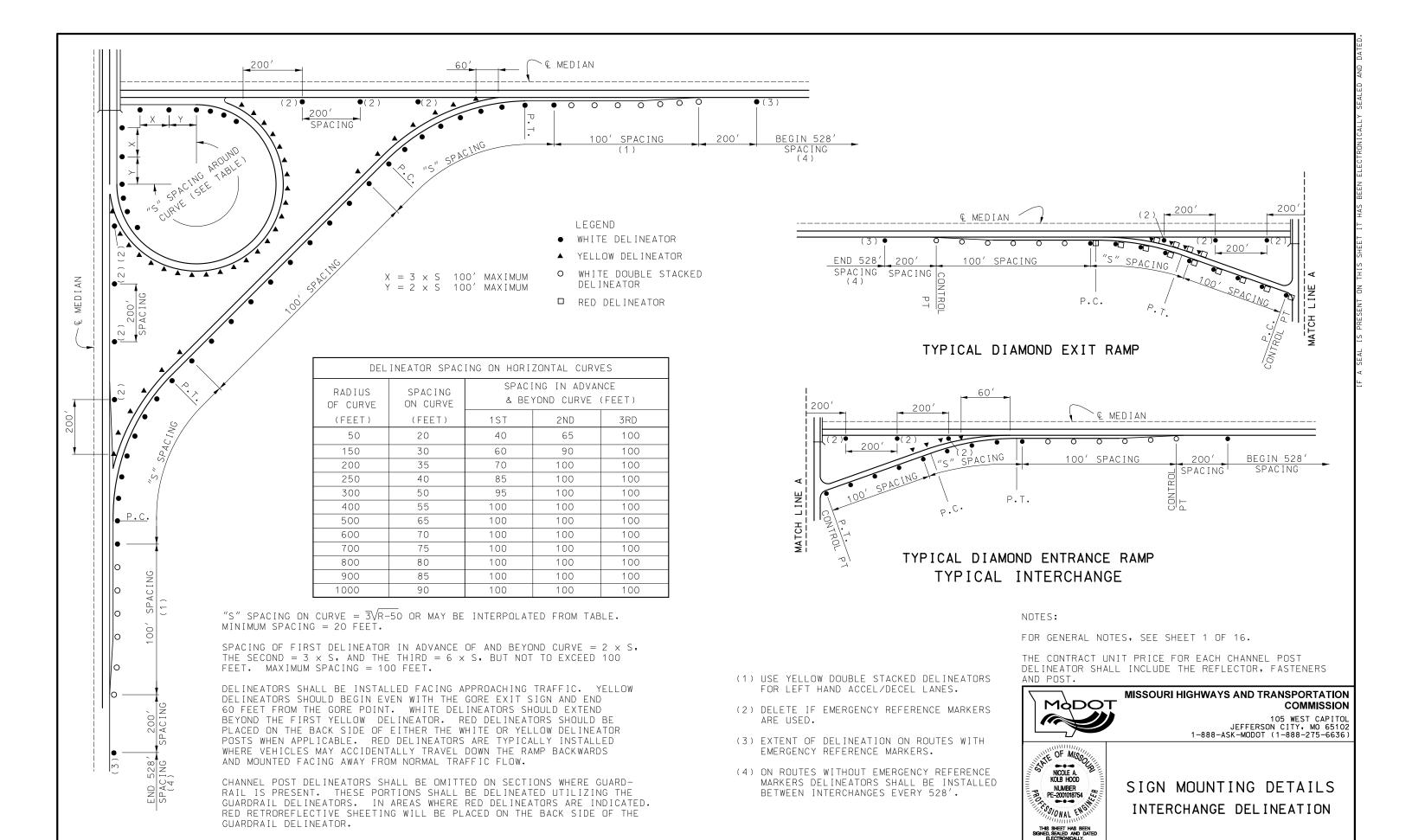


SIGN MOUNTING DETAILS GUARDRAIL AND GUARDCABLE DELINEATORS

DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 4/11/2022

903.03BP

SHEET NO. 13 OF 16



SHEET NO.

14 OF 16

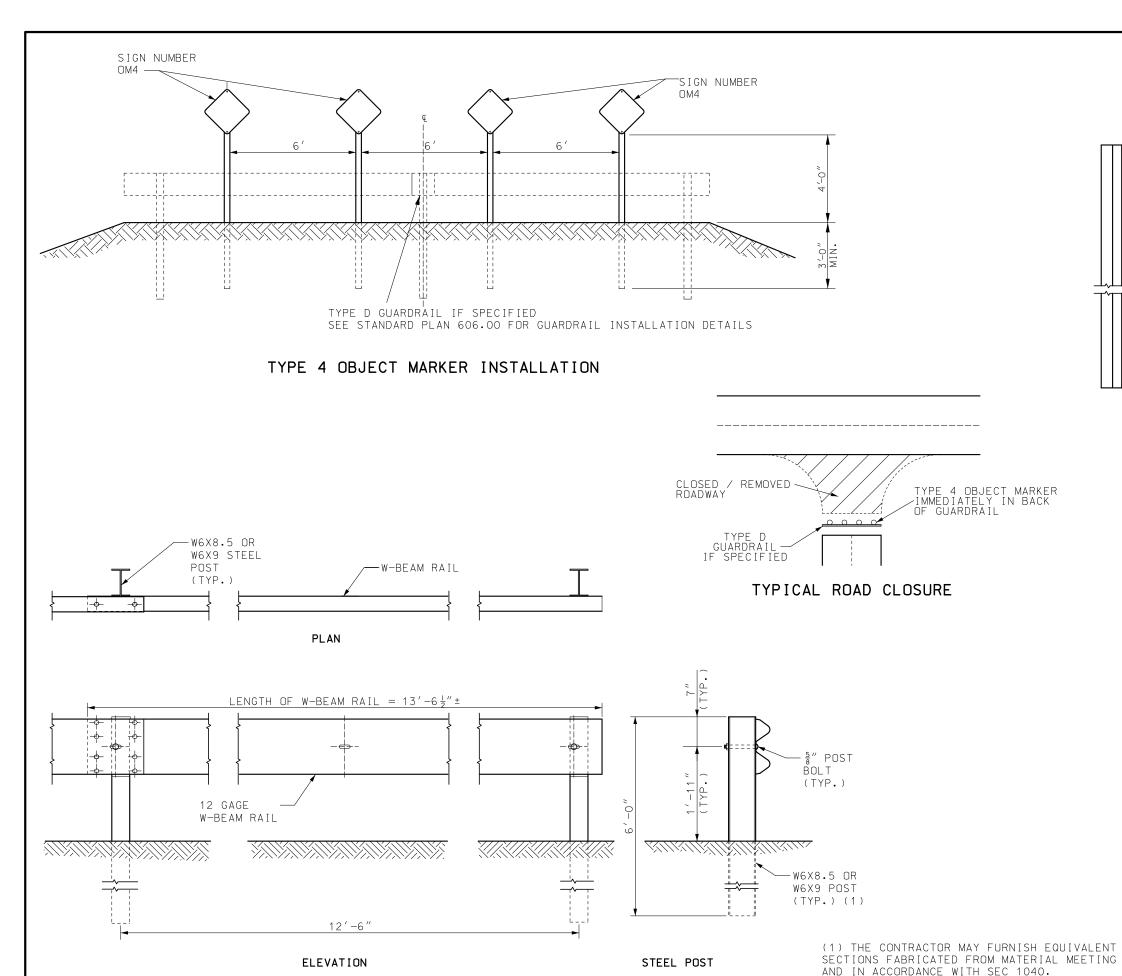
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DATE EFFECTIVE: 07/01/2022

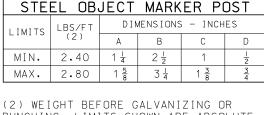
4/11/2022

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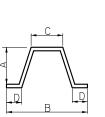
REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.



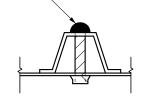
TYPE D GUARDRAIL



PUNCHING. LIMITS SHOWN ARE ABSOLUTE. NO FURTHER WEIGHT, DIMENSIONAL OR COMMERCIAL TOLERANCE WILL BE ACCEPTABLE.



BURR THREADS OF BOLT AS APPROVED BY THE ENGINEER.



HOLE PUNCHING TO EQUAL  $\frac{3}{8}''$  DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF

### OBJECT MARKER POST AND FASTENER DETAILS

#### NOTES:

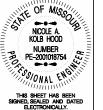
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

TYPE D GUARDRAIL IS ACCESS RESTRAINT AND VISUAL TARGET VALUE ONLY. IT HAS NO REDIRECTIVE CAPABILITY.



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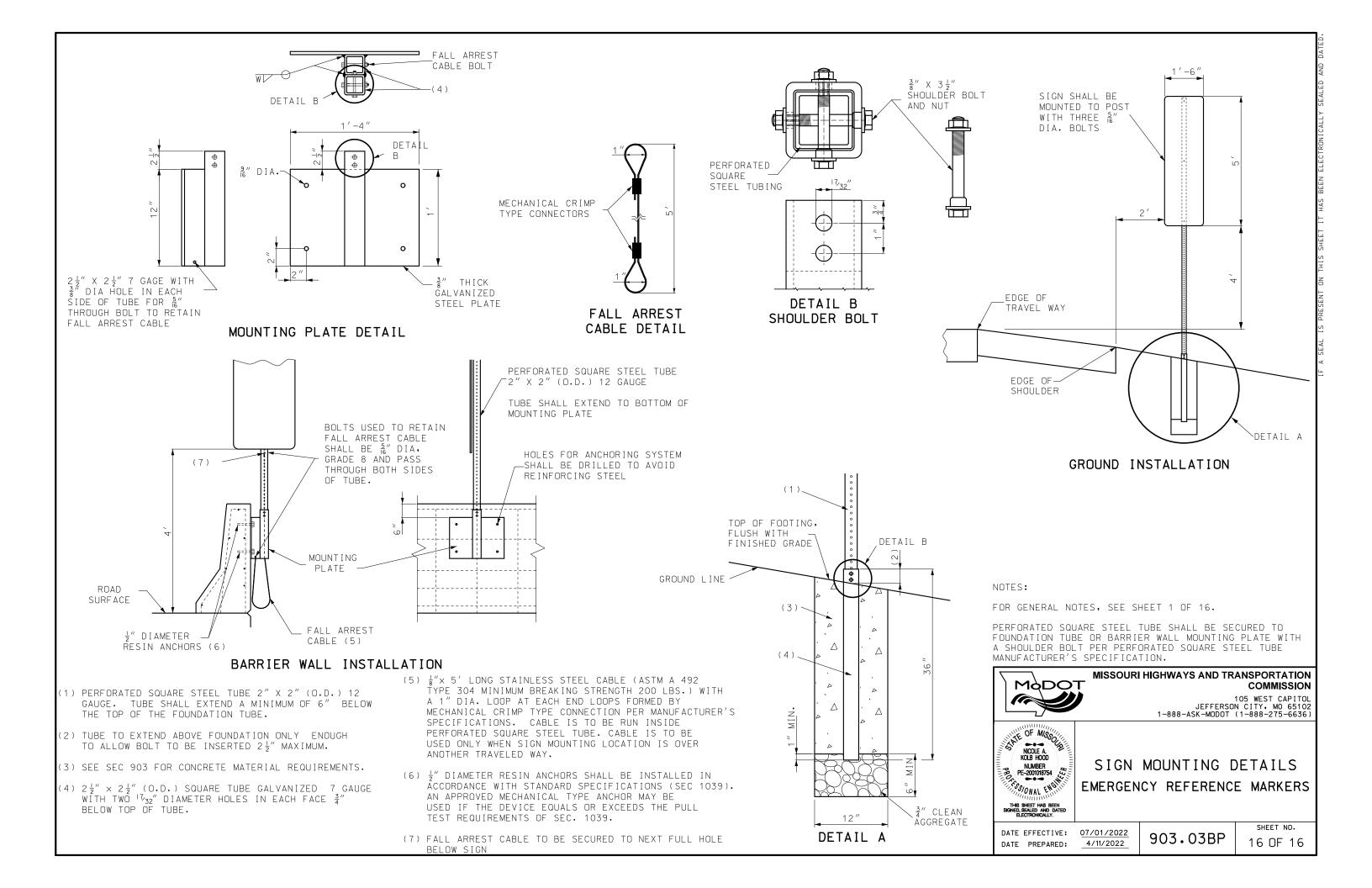


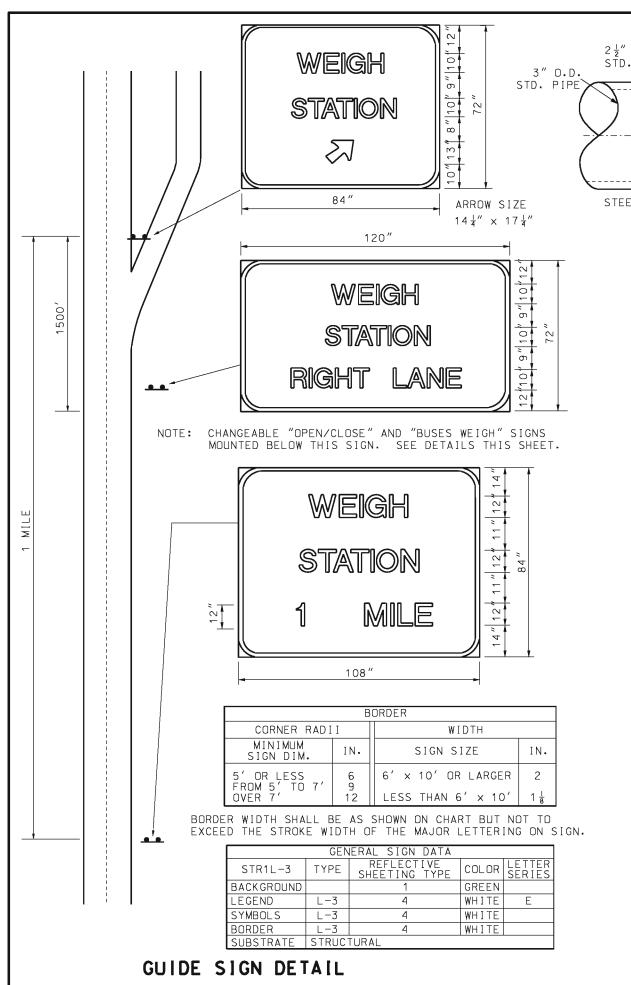
SIGN MOUNTING DETAILS OBJECT MARKERS FOR ROAD CLOSURE

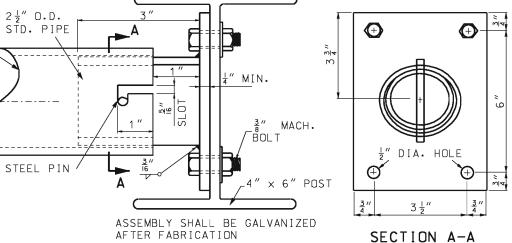
DATE EFFECTIVE: 07/01/2022 DATE PREPARED: 4/11/2022

903.03BP

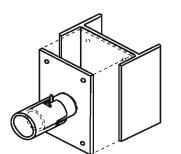
SHEET NO. 15 OF 16











PLAN VIEW

Ρ SIGN Ε Н Κ В С D G L Ν  $4\frac{1}{2}'$ 3" 6" 8 "

GENERAL SIGN DATA													
SHR1L-1	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES									
BACKGROUND		1	WHITE										
LEGEND	L-1		BLACK	С									
SYMBOLS													
BORDER	L-1		BLACK										
SUBSTRATE	SHEET												

## ISOMETRIC VIEW

# BUSES WEIGH MOUNTING ASSEMBLY

#### OPEN CLOSED

FOR OPEN AND CLOSED SIGN SEE SPECIAL PROVISIONS



MAXIMUM HEIGHT FROM BOTTOM OF BUSES WEIGH SIGN TO GROUND SHALL BE 60".

	GENERAL SIGN DATA													
SHR1L-3	TYPE	REFLECTIVE SHEETING TYPE	COLOR	LETTER SERIES										
BACKGROUND		1	GREEN											
LEGEND	L-3	4	WHITE	Е										
SYMBOLS														
BORDER	L-3	4	WHITE											
SUBSTRATE	SHEET													

## CHANGEABLE SIGN DETAIL

SUBSTRATE ST STRUCTURAL SH SHEET

LEGEND, SYMBOLS, & BORDER L-1 SCREEN PRINT L-3 DIRECT APPLIED (CUT FROM MATERIAL SHOWN ON PLANS.)

REFLECTIVE SHEETING R1 ENGINEERING GRADE IN ACCORDANCE WITH SEC 1042.2.7.1 R4 PRISMATIC IN ACCORDANCE WITH SEC 1042.2.7.3

## PERMIT SIGN DETAIL

MATERIAL LIST											
NO.	DESCRIPTION	LB.									
2	4" STEEL PLATE	2.26									
1	3" STANDARD PIPE	32.44									
	2-1/2" STANDARD PIPE	3.89									
8	訁" GALV. MACH. BOLT										
8	GALV. WASHER										

GENERAL NOTES:

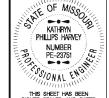
DESIGN SPECS: AASHTO STANDARD SPECIFCATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARES, AND TRAFFIC SIGNALS - 1975.

MATERIALS AND FABRICATION SHALL CONFORM TO THE REQUIREMENTS OF THE STATE HIGHWAY AND TRANSPORTATION COMMISSION STANDARD SPECIFICATIONS AND PROVISIONS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY MO 65102 1-888-ASK-MODOT (1-888-275-6636)



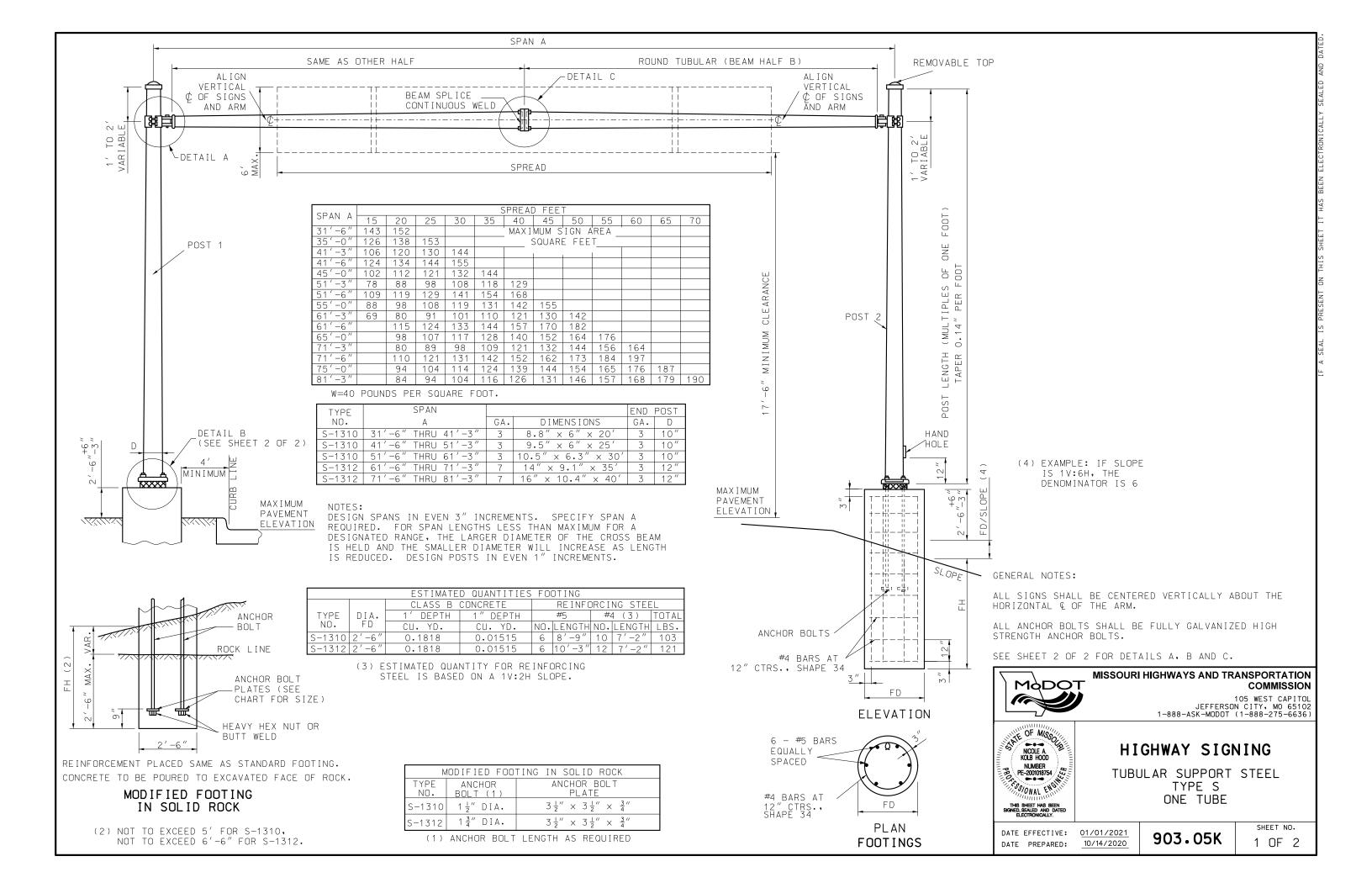
# HIGHWAY SIGNING

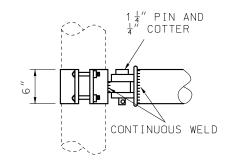
WEIGH STATION

DATE EFFECTIVE: 02/01/2012 DATE PREPARED:

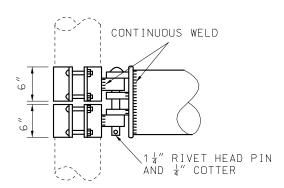
903.04F

SHEET NO. 1 OF 1





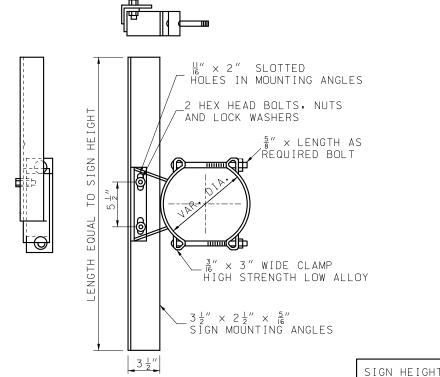
# TUBE DIAMETER EQUAL TO OR LESS THAN 10½" AT CENTER OF SPÁN



TUBE DIAMETER GREATER THAN 10 1/2" AT CENTER OF SPAN

DETAIL A

BEAM CLAMP



NOTE: MINIMUM OF TWO BRACKETS ARE REQUIRED FOR SIGNS OVER 42" IN LENGTH.

# GALVANIZED SIGN BRACKET ASSEMBLY

 $1\frac{1}{4}$ " × 4" HIGH TENSILE HEX HEAD BOLTS 2<sup>3</sup>/<sub>4</sub>" THREAD LENGTH -Γ4 <sup>4</sup>REQUIRED

SECTION A-A

MAXIMUM LIN. FT.

OF SIGN WIDTH

PER BRACKET

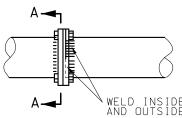
13

(INCHES)

48 & UNDER

60

72



TUBE DIAMETER 9½" AND UNDER



VELD INSIDE AND OUTSIDE

 $1\frac{1}{4}$ " × 4" HIGH TENSILE

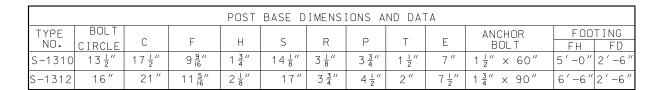
 $2\frac{3}{4}$ " THREAD LENGTH -

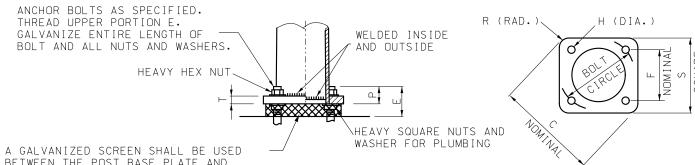
HEX HEAD BOLTS

SECTION B-B

6 REQUIRED

DETAIL C

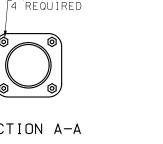


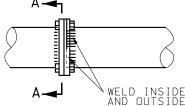


BETWEEN THE POST BASE PLATE AND CONCRETE BASE, SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH. 21 GAGE OR HEAVIER. STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.

ELEVATION

DETAIL B POST BASE PLAN





OVER 9날"

BEAM SPLICE



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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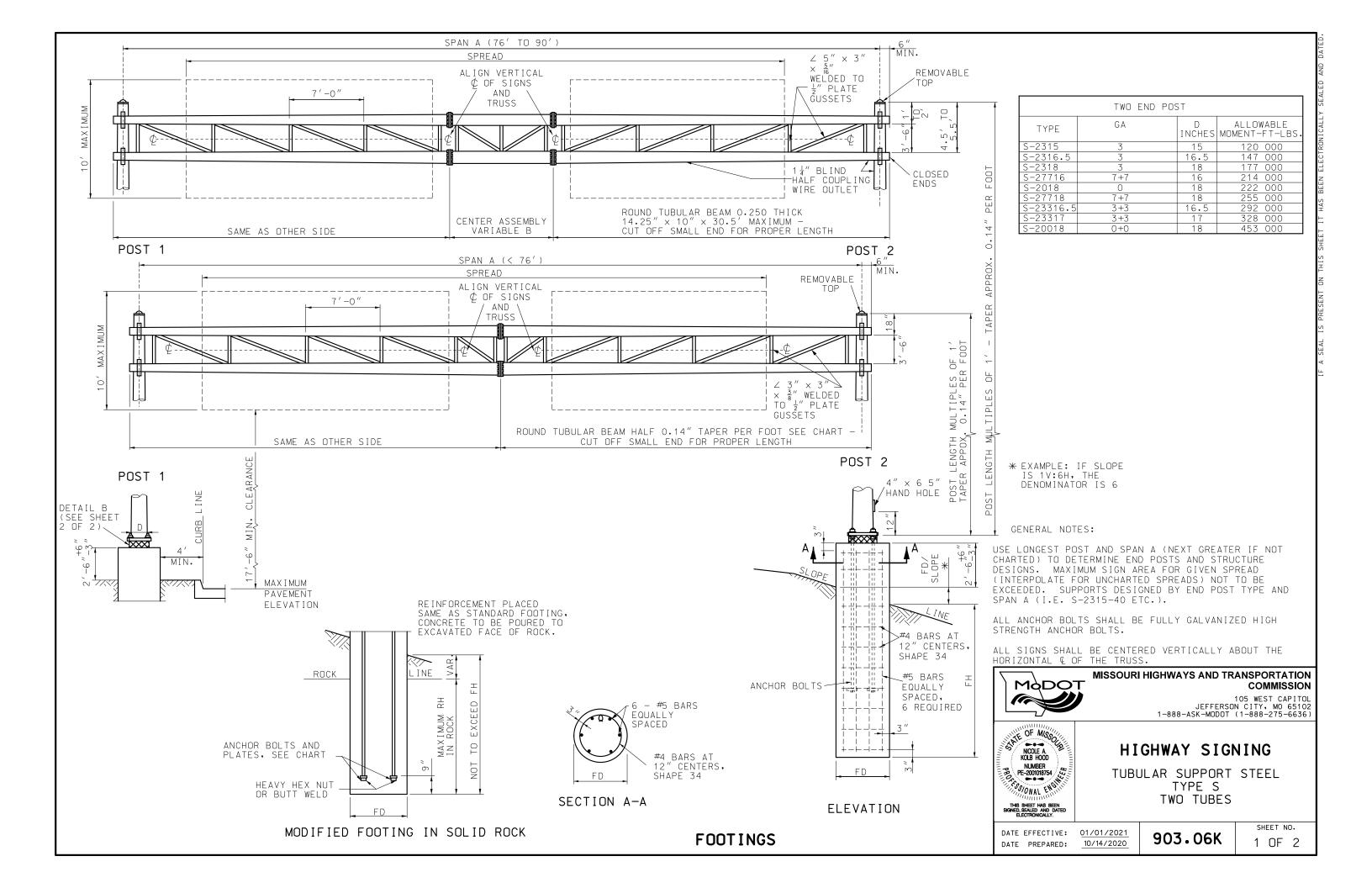
# HIGHWAY SIGNING

TUBULAR SUPPORT STEEL TYPE S ONE TUBE

DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

903.05K

SHEET NO. 2 OF 2

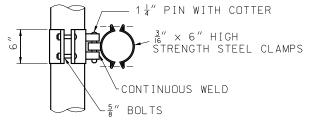


SPAN		STRUCTURE	POSTS FOR MAXIMUM AREA
SPREAD IN FEET	TUBULAR BE	BEAMS CENTER SECTION B	
	GA LARGE M	MIN. THICK- NESS O.D. LENGTH	LENGTH OF POSTS IN FEET
FEET 30 35 40 45 50 55 60 65 70	5 80 85 90 M DIA.	[ 14233 3131 22113111	18 19 20 21 22 23 24 25 26 27
40   300		20.5′	S-2315   S-2315   S-2315   S-2316.5   S-2316.5   S-2316.5   S-2318   S-2318   S-2318   S-2318   S-2318
45   264   288	3 9.5" 23	23.0′	S-2315   S-2315   S-2315   S-2316.5   S-2316.5   S-2316.5   S-2318   S-2318   S-2318   S-2318
50 282 308 336 55 238 262 284 310	3 10.5" 25	25.5′	S-2315   S-2316.5   S-2316.5   S-2316.5   S-2318   S-2318   S-2318   S-27716   S-27716   S-27716   S-27716
50 282 308 336	3 10.5" 28	28.0′	S-2315   S-2316.5   S-2316.5   S-2316.5   S-2318   S-2318   S-2318   S-2318   S-27716   S-27716
$\blacksquare$   60   266   288   314   340   364         $^{97}G_{N}$ !	7   14.0"   30	30.5′	S-2318 S-27716 S-27716 S-27716 S-2018 S-27718 S-27718 S-27718 S-27718 S-23316.5 S-23316.5
65   234   256   280   304   328   352		33.0	S-2318 S-27716 S-27716 S-27716 S-27716 S-27716 S-27718 S-27718 S-27718 S-23316.5 S-23316.5
70   262   284   304   324   346   368   394	1 14.0" 3 14.0" 3 14.0" 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	35.5′	S-27716  S-27716  S-27716  S-27718   S-27718   S-27718   S-23316.5  S-23316.5  S-23316.5  S-23317
75   228   248   268   288   308   330   352   374	3 14.0" 38	38.0′	S-27716  S-27716  S-27716  S-2018   S-27718   S-27718   S-27718   S-23316.5  S-23316.5
76   295   308   326   350   370   397   425   450   472	02	30.5′ 312″  14.238″ 16′	S-27716   S-27718   S-27718   S-27718   S-23316.5   S-23316.5   S-23317   S-23317   S-23317   S-20018
79   310   326   347   366   384   410   432   460   490	20   3   14.25 "  28	28.5' 312" 14.238" 23'	S-2018   S-27718   S-27718   S-23316.5   S-23316.5   S-23317   S-23317   S-23317   S-20018   S-20018
83   277   288   300   322   340   360   385   412   434	65   498     3   14.25   3	30.3 312 11.230 23	S-27716    S-2018   S-27718   S-27718   S-23316.5   S-23316.5   S-23316.5   S-23317   S-23317   S-20018
86   297   309   322   337   356   378   402   425   447	73   500   522   3   14.25"   28	28.0' 312"  14.238"   30'	S-2018   S-27718   S-27718   S-23316.5   S-23316.5   S-23317   S-23317   S-23317   S-20018   S-20018
90   269   280   294   310   327   345   363   385   403	26   446   466   485   3  14.25" 30	30.5" 312" 14.238" 30'	S-27716   S-27718   S-27718   S-23316.5   S-23316.5   S-23316.5   S-23317   S-23317   S-20018   S-20018

			В	ASE DA	ТА									FOOTIN	GS						ITITIES DTINGS	5	
TYPE	BOLT									I	N EART	Н			IN SO	LID ROCK	CLASS				ING ST	EEL T	ГОТА
NO.	CIRCLE	С	F	Н	P	R	S	Т	E	DIA.		R BOLTS			R BOLTS	PLATES	CY/FT	CY/IN			#4 BAF		LBS.
										FD FH	DIA.	LENGTH	MAX	DIA.	LENGTH	TLATES					NO.LE		
S-2315	22"	28 <del>5</del> "	15½"	$2\frac{3}{8}''$	4 3 "	4 <del>5</del> "	23"	2"	8 ½"	2'-6" 8'	2 "	96"	3′	2 "		$3.5" \times 3.5" \times 0.7$	5″0.1818	0.01515	6 1	11′-9″	13 7'	-2"	136
S-2316.5	23½"	30 ½″	16 <del>5</del> "	$2\frac{3}{8}''$	$4\frac{3}{4}''$	5 "	$24\frac{1}{2}''$	2 "	8 ½"	3'-0"10	2 "	96"	3′	2 "		$3.5" \times 3.5" \times 0.7$	5″ 0.2618	0.0218	6 1	14′-0″	15 8	-9"	176
S-2318	$25\frac{1}{2}''$	33"	18"	$2\frac{3}{8}''$	4 3 "	5 ½"	$26\frac{1}{2}''$	2 "	8 ½"	3'-0"10	2"	96"	3′	2 "	AS	$3.5" \times 3.5" \times 0.7$	5″0.2618	0.0218	6 1	14′-0″	15 8	-9"	176
S-27716	23 ½"	30 ½"	16 \frac{5}{8}"	2 <del>5</del> "	5 ½"	5"	$24\frac{1}{2}''$	$2\frac{1}{2}''$	9 ½"	3'-0"10	2 ¼"	96"	3′	2 ¼"	REQUIRED	$4.5'' \times 4.5'' \times 0.7$	5″0.2618	0.0218	6 1	14′-0″	15 8	-9"	176
S-2018	25 ½"	33"	18"	2 <del>5</del> "	5 ½"	5 ½"	26½"	$2\frac{1}{2}''$	9 ½"	3'-6"11	2 ¼"	96"	4 ′	2 4"	SEE	$4.5'' \times 4.5'' \times 0.7$	5"0.3563	0.0297	6 1	5′-3″	17 10	′ –4 ″	212
S-27718	$25\frac{1}{2}''$	33"	16"	$2\frac{7}{8}''$	6"	$5\frac{1}{2}''$	$26\frac{1}{2}''$	$2\frac{1}{2}''$	10½"	3'-6"11	$2\frac{1}{2}''$	120"	4 ′	$2\frac{1}{2}''$	ROCK	5" x 5" x 1"	0.3563	0.0297	6 1	5′-3″	17 10	′ –4 ′′	212
S-23316.5	$23\frac{1}{2}''$	30 ½″	16 <del>5</del> "	3 3 "	7 "	5 "	$24\frac{1}{2}''$	3 "	12"	3'-6"12	′ 3″	144"	4 ′	3 "	FOOTING	5" × 5" × 1"	0.3563	0.0297	6 1	6′-3″	18 10	′ –4 ″	226
S-23317	$25\frac{1}{2}''$	33"	18"	3 3 "	7 "	5 ½"	$26\frac{1}{2}''$	3"	12"	3'-6"12	′ 3″	144"	4 ′	3 "		5" x 5" x 1"	0.3563	0.0297	6 1	6′-3″	18 10	′ –4 ″	226
S-20018	25 ½"	33"	18"	3 \frac{3}{8}"	7 "	5 ½"	$26\frac{1}{2}''$	3"	12"	4'-0"12	′ 3″	144"	5′	3 "		5" x 5" x 1"	0.4654	0.0388	6 1	6′-6″	18 11 ′	-10"	245
													NIZ E	CTILLA		TITY FOR REINFORCE	IO CTEEL	TO DACE	0 1	4 0 4	(11.17)	CI ODE	

TUBE DIA.	А	В	NO, OF BOLTS
9 <u>1</u> "	11½"	12 ½"	4
10½"	14 <del>5</del> "	14"	4
14.0"	17 ¼"	17"	6

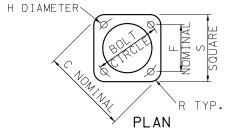
\* ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.



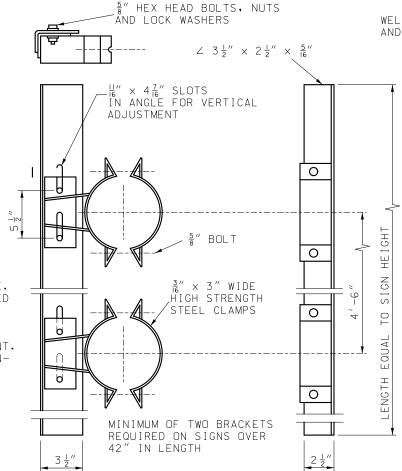
# BEAM CLAMP DETAIL

ANCHOR BOLTS AS SPECIFIED. THREAD UPPER PORTION E. -GALVANIZE ENTIRE LENGTH WELD INSIDE AND OUTSIDE OF BOLT AND ALL NUTS AND WASHERS. A GALVANIZED SCREEN SHALL HEAVY SQUARE NUTS AND WASHERS FOR PLUMBING.

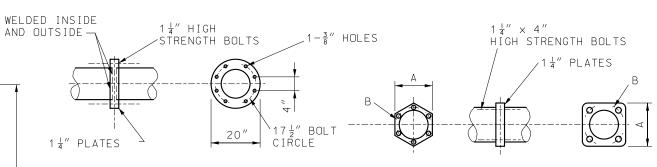
ELEVATION



BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH. 21 GAGE OR HEAVIER. STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.



GALVANIZED SIGN BRACKET ASSEMBLY



SPANS 76' TO 90'

SPANS UP TO 76'

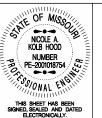
# BEAM SPLICE DETAIL

SIGN HEIGHT INCHES	MAX. LIN. FT. OF SIGN WIDTH PER BRACKET
48 & UNDER	16
60	16
72	15
84	11
96	6
108	4
120	3



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



# HIGHWAY SIGNING

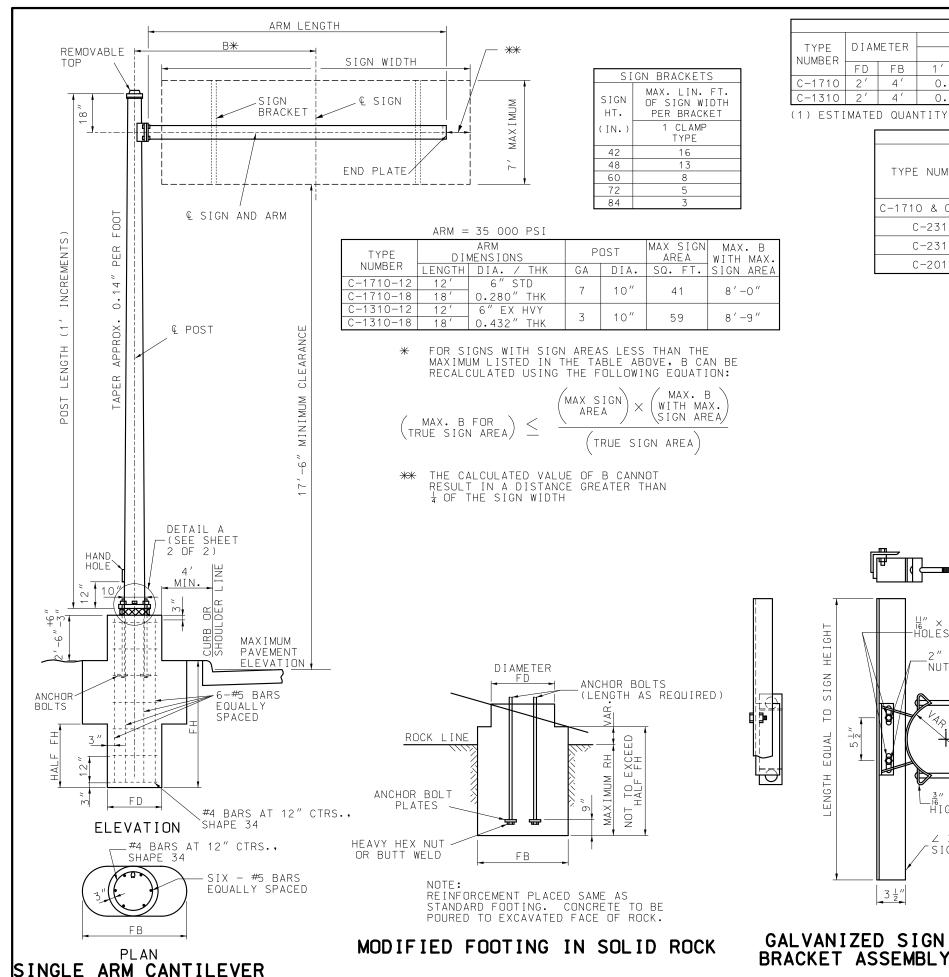
TUBULAR SUPPORT STEEL TYPE S TWO TUBES

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

903.06K

SHEET NO. 2 OF 2

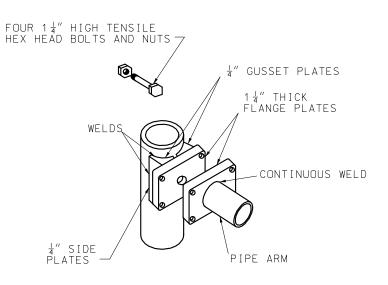
DETAIL B POST BASE DETAIL



	ESTIMATED QUANTITIES											
TYPF	DIAMETER		CU YD CLASS B CONCRETE FOOTING					REINFORCING STEEL				
NUMBER			FD SECTION		FB SECTION		#5		#4 (1)		TOTAL	
NOMBLI	FD	FΒ	1' DEPTH	1" DEPTH	1' DEPTH	1" DEPTH	NO.	FT-IN	NO.	FT-IN	LBS	
C-1710	2′	4 ′	0.11635	0.0097	0.2645	0.0220	6	7′-6″	9	5'-7"	81	
C-1310	2′	4 ′	0.11635	0,0097	0.2645	0.0220	6	7′-6″	9	5'-7"	81	

(1) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

MODIFIED FOOTING IN SOLID ROCK									
TYPE NUMBER	ANCHOR BOLT DIA.	BOLT ANCHOR BOLT PLATE		FOOTING			CLASS B CONCRETE FOOTING FB SECTION CU. YD.		
			RH	FD	FB	1' DEPTH	1" DEPTH		
C-1710 & C-1310	1 ½"	$3\frac{1}{2}$ " $\times$ $3\frac{1}{2}$ " $\times$ $\frac{3}{4}$ "	2′-6″	2′-0″	3′-0″	1904	0159		
C-2315	2 "	$3\frac{1}{2}'' \times 3\frac{1}{2}'' \times \frac{3}{4}''$	3′-0″	3′-0″	3′-6″	3173	0264		
C-2318	2 "	$3\frac{1}{2}'' \times 3\frac{1}{2}'' \times \frac{3}{4}''$	3′-6″	3′-6″	3′-6″	3563	0297		
C-2018	2 ¼"	$4\frac{1}{2}$ " $\times$ $4\frac{1}{2}$ " $\times$ $\frac{3}{4}$ "	3′-6″	3′-6″	3′-6″	3563	0297		



### FOR POLE DIAMETER UNDER 12" ARM ATTACHMENT

GENERAL NOTE:

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL & OF THE ARM.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.





 $\frac{11}{16}$ " × 2" SLOTTED

5

10

EQUAL

-HOLES IN MOUNTING ANGLE

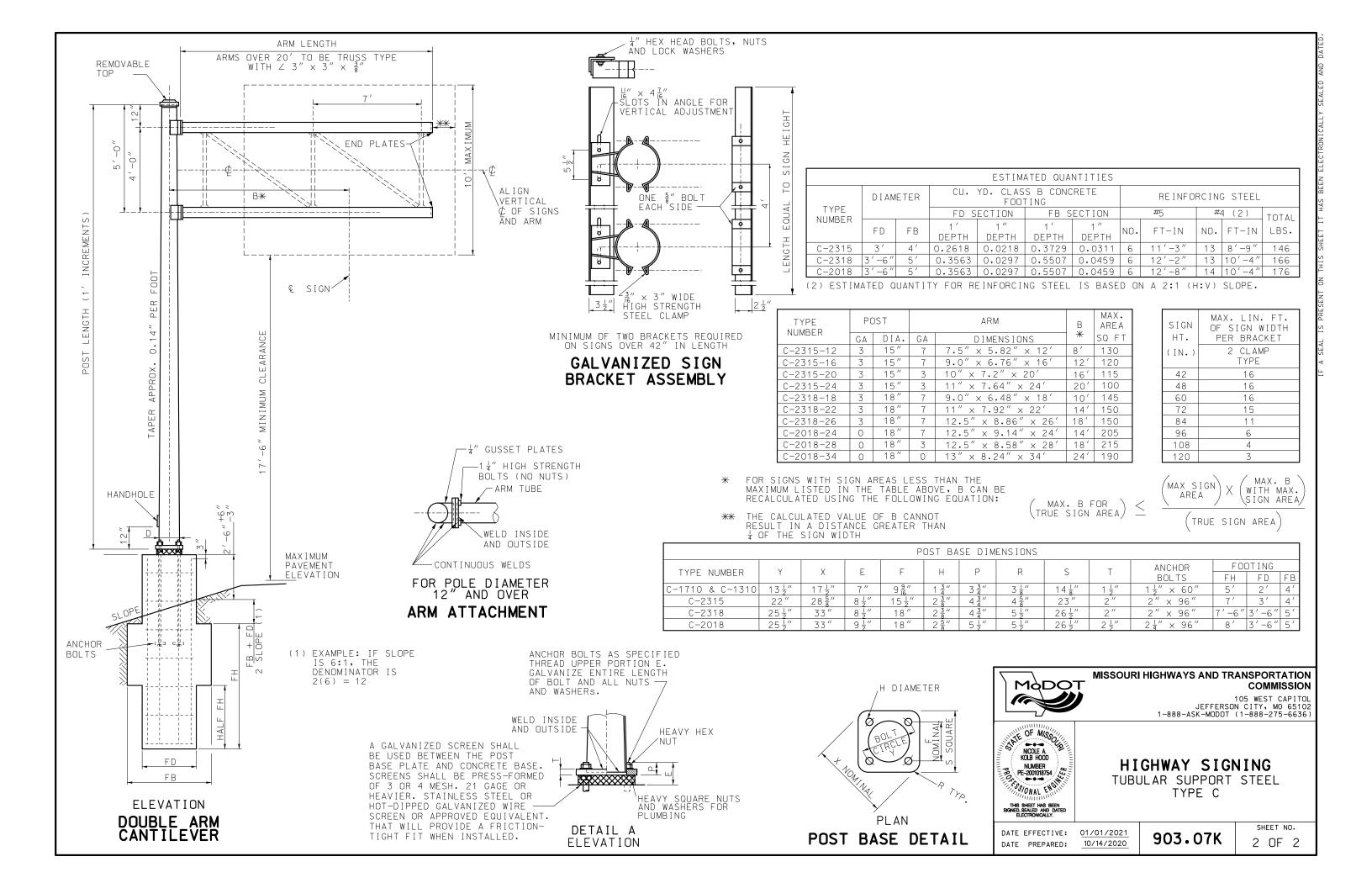
NUTS AND LOCK WASHERS

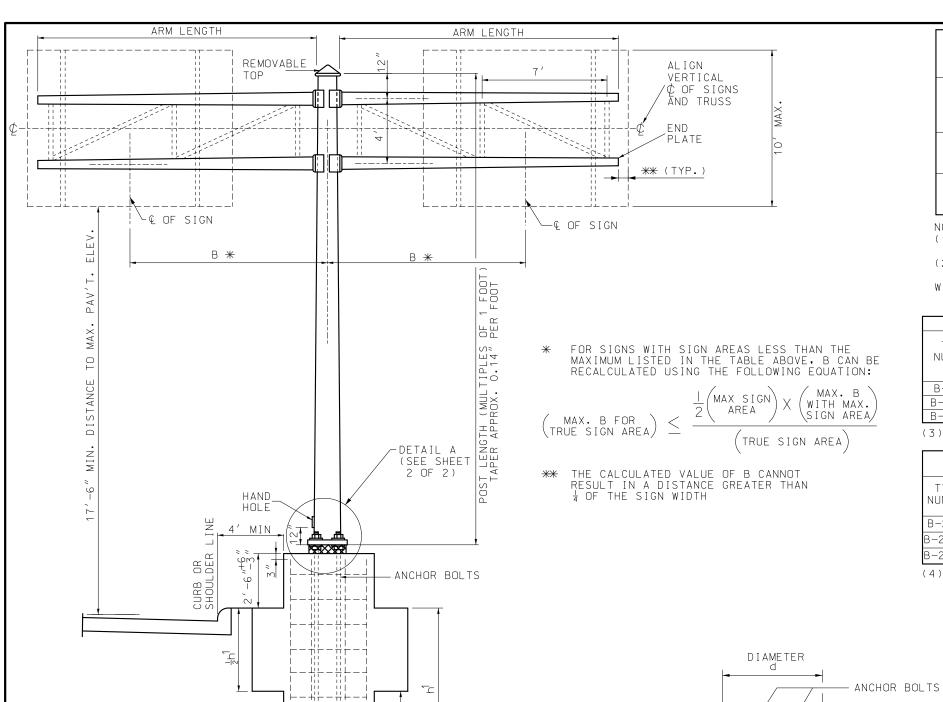
§″ BOLTS

\_3" × 3" WIDE CLAMP HIGH STRENGTH LOW ALLOY

 $\angle$  3½" × 2½" × ½" SIGN MOUNTING ANGLES

2" HEX HEAD BOLTS





SIX - #5 BARS

EQUALLY SPACED

TYPE		POST			ARM	MAX. AREA
NUMBER	GA.	(2) SQ. FT.				
	0	8 ′	18"	7	7.5" x 5.82" x 12'	260
B-2018	0	12′	18"	7	9.0" x 6.76" x 16'	240
B-2016	0	16′	18"	3	10.0" × 7.2" × 20'	230
	0	20′	18"	3	$11.0'' \times 7.64'' \times 24'$ (1)	200
	3+3	10′	18"	7	9" × 6.48" × 18'	290
B-23318	3+3	14′	18"	7	$11'' \times 7.92'' \times 22'$ (1)	300
	3+3	18′	18"	7	$12.5'' \times 8.86'' \times 26'$ (1)	300
	0+0	14′	18"	7	$12.5'' \times 9.14'' \times 24'$ (1)	410
B-20018	0+0	18′	18"	3	$12.5'' \times 8.58'' \times 28'$ (1)	430
	0+0	24′	18"	0	$13'' \times 24'' \times 34'$ (1)	430

#### NOTES:

- (1) ARMS OVER 20' TO BE TRUSS TYPE WITH  $\angle$  3"  $\times$  3"  $\times$   $\frac{3}{8}$ " ANGLES.
- (2) MAX SIGN AREA ON EACH SIDE EQUALS HALF THE TOTAL IN CHART.

W = 40# PER SQUARE FOOT

				ESTIMATE	ED QUANT	ITIES										
TYPE	DIA.	DIA.	CLASS B	CLASS B CONCRETE FOOTING (C.Y.) REINFORCING STEEL												
NUMBER	/ <sub>"d</sub> "	″b″	"d" SE	CTION	"b" SI	ECTION		#5	#2	4 (3)	TOTAL					
NOWBER			1 ′	1 "	1 ′	1 "	NO.	FTIN.	NO.	FTIN.	LBS.					
			DEPTH	DEPTH	DEPTH	DEPTH										
B-2018	3′-6″	6'-0"	0.3563	0.0297	0.6800	0.0567	6	10'-0"	11	10'-4"	139					
B-23318	3'-6"	7'-0"	0.3563	0.0297	0.8100	0.0675	6	10'-6"	12	10'-4"	149					
B-20018	3'-6"	7'-0"	0.3563	0.0297	0.8100	0.0675	6	12'-0"	13	10'-4"	165					

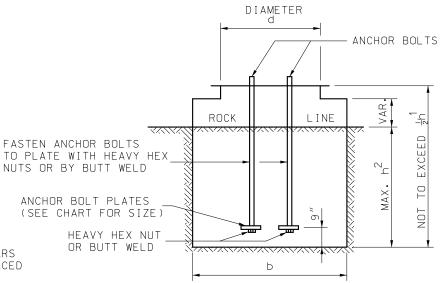
(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

	MODIFII	ED FOOTING IN SO	LID RO	ICK		CLASS B FOOTING	CONCRETE CU. YD.				
TYPE	ANCHOR	ANCHOR	F	OOTIN	3	"b" SECTION					
NUMBER	BOLT (4) (DIA.)	BOLT PLATE	″h <sup>2</sup> ″	"d"	"b"	1' DEPTH	1" DEPTH				
B-2018	2 ¼"	$4\frac{1}{2}$ " $\times$ $4\frac{1}{2}$ " $\times$ $\frac{3}{4}$ "	3′-6″	3′-6″	3′-6″	0.3563	0.0297				
B-23318	3 "	$5\frac{1}{2}$ " × $5\frac{1}{2}$ " × 1"	4'-0"	3′-6″	4′-6″	0.4860	0.0405				
B-20018	3 "	$5\frac{1}{2}$ " × $5\frac{1}{2}$ " × 1"	5′-0″	3′-6″	4′-6″	0.4860	0.0405				

(4) ANCHOR BOLT LENGTH AS REQUIRED

REINFORCEMENT SAME AS STANDARD FOOTING

CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK



MODIFIED FOOTINGS IN SOLID ROCK

GENERAL NOTE:

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL & OF THE TRUSS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED HIGH STRENGTH ANCHOR BOLTS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



HIGHWAY SIGNING TUBULAR SUPPORT STEEL TYPE B

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

903.08J

SHEET NO.

PLAN FOOTING

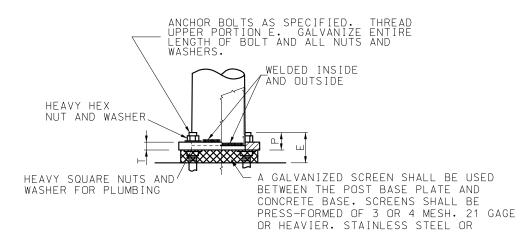
#43 BARS AT

12" CENTERS

SHAPE 34

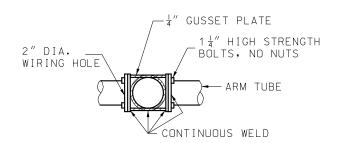
NUMBER PE-2001018754

1 OF 2

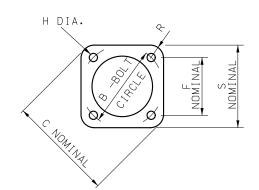


## DETAIL A **ELEVATION BASE DETAIL**

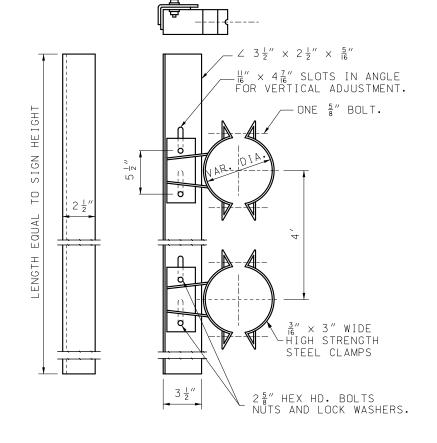
INSTALLED.



## ARM ATTACHMENT DETAIL



## PLAN POST BASE DETAIL



## GALVANIZED SIGN BRACKET ASSEMBLY \*

SIGN HEIGHT INCHES	MAX, LIN, FT, OF SIGN WIDTH PER BRACKET
48 & UNDER	16
60	16
72	15
84	11
96	6
108	4
120	3

\* MINIMUM OF TWO BRACKETS REQUIRED ON SIGNS OVER 42" IN LENGTH

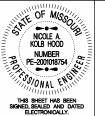
									_				
					P03	ST BAS	E DIME	ENSION	S				
TYPE NUMBER	В	С	F	Н	S	R	Р	Т	E	ANCHOR BOLTS	/h <sup>1</sup> //	00TIN	G "b"
B-2018	25 ½"	33"	18"	2 <del>5</del> "	26½"	5 ½"	5 ½"	2 ½"	9 ½"	$2\frac{1}{4}'' \times 96''$	7′-6″	3′-6″	6′-0″
B-23318	25 ½"	33"	18"	3 3 "	26 ½"	5 ½"	7 "	3 "	12"	3" × 120"	8'-0"	3′-6″	7′-0″
B-20018	25 ½"	33"	18"	3 3 "	26½"	5 ½"	7 "	3 "	12"	3" × 120"	9′-6″	3′-6″	7′-0″

HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN

# MODOT

#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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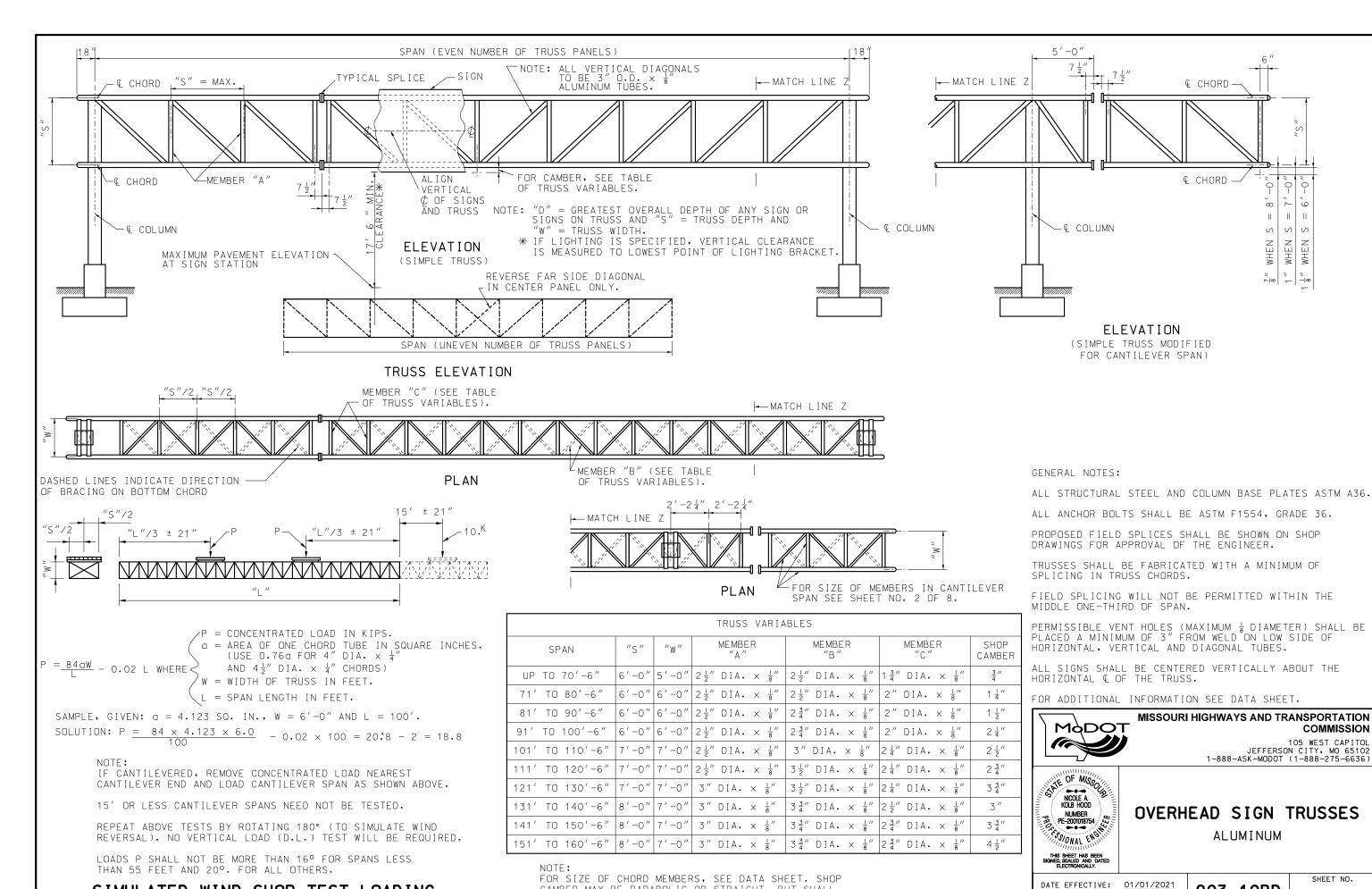


HIGHWAY SIGNING TUBULAR SUPPORT STEEL TYPE B

DATE EFFECTIVE: 01/01/2021 DATE PREPARED: 10/14/2020

903.08J

SHEET NO. 2 OF 2



CAMBER MAY BE PARABOLIC OR STRAIGHT, BUT SHALL

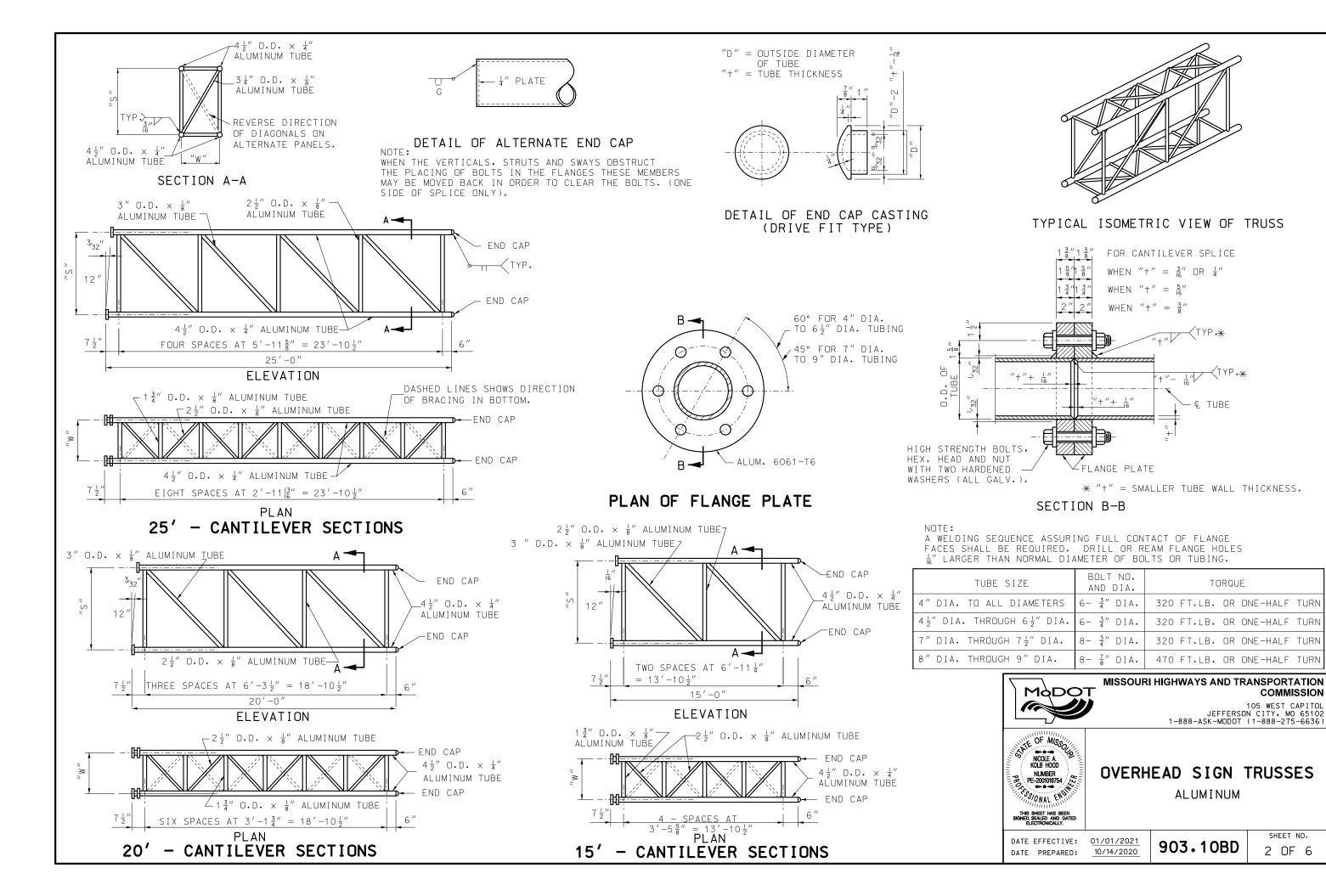
BE SYMMETRICAL ABOUT CENTERLINE OF SPAN.

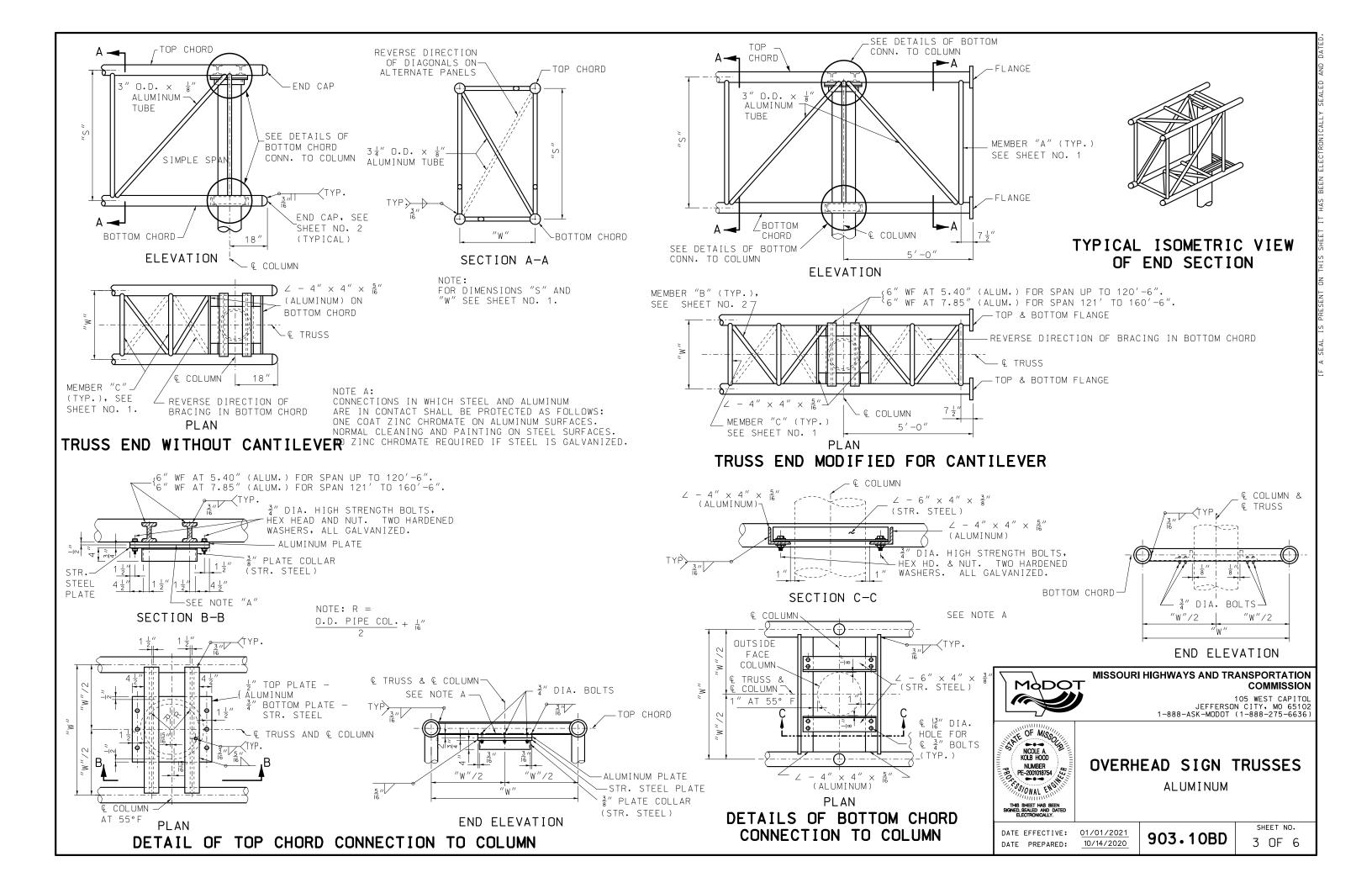
SIMULATED WIND-SHOP TEST LOADING

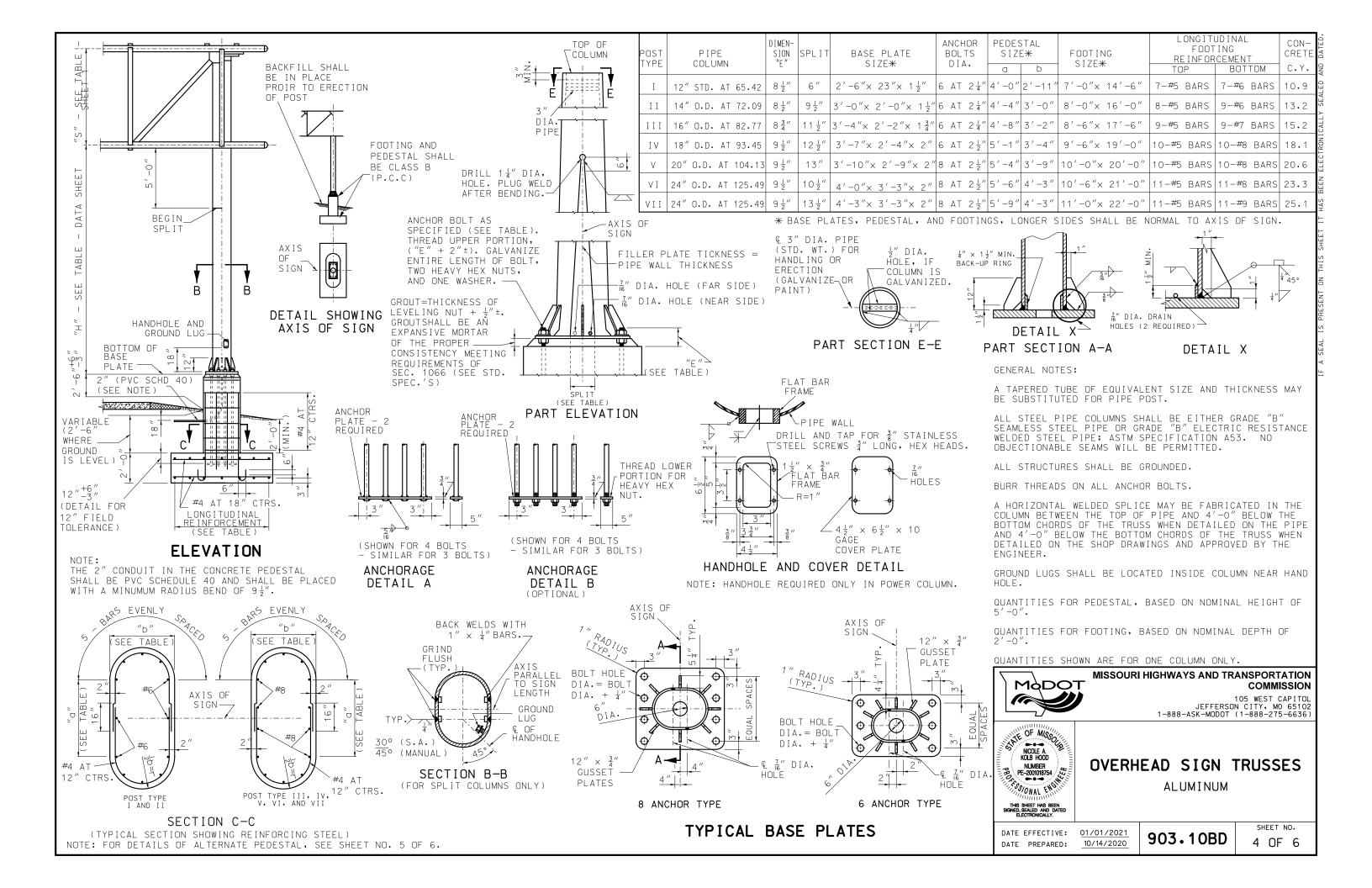
903.10BD 1 OF 6

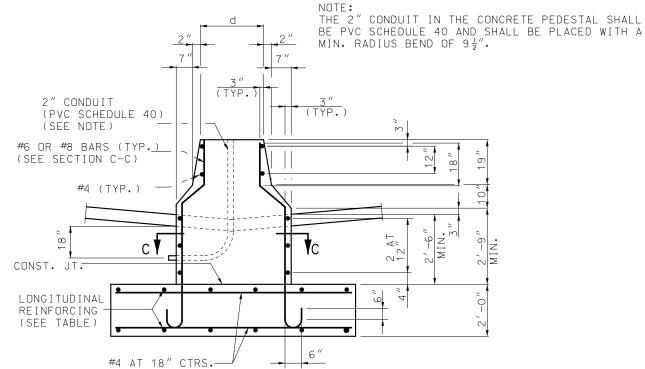
10/14/2020

DATE PREPARED:









PART ELEVATION

(TYPE A CONCRETE TRAFFIC BARRIER)

V 20" O.D. AT 104.13 7'-8" 2'-11' VΙ 24" O.D. AT 125.49 3'-5" 8'-3" VII 24" O.D. AT 125.49 3'-5" \* BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.

PIPE

COLUMN

12" STD. AT 65.42

14" O.D. AT 72.09

16" O.D. AT 82.77

18" O.D. AT 93.45

TYPF

ΙI

ΙΙΙ

ΙV

PEDESTAL

SIZE \*

d 2'-1'

2'-2"

2'-4"

2'-6"

С

5'-9"

6'-2"

6'-7"

7'-1"

FOOTING

SIZE \*

 $7'-0'' \times 14'-6'$ 

 $8'-0'' \times 16'-0'$ 

 $8'-6'' \times 17'-6''$ 

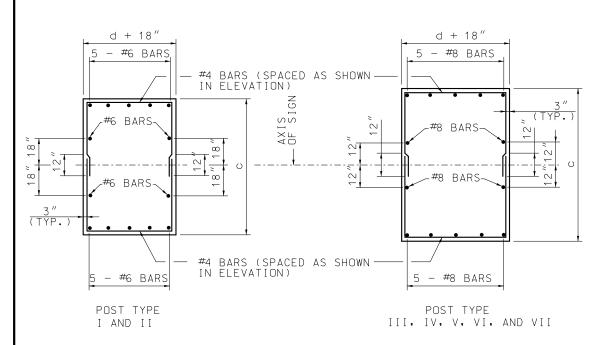
 $9'-6'' \times 19'-0''$ 

 $10'-0'' \times 20'-0'$ 

 $10'-6'' \times 21'-0'$ 

11'-0" × 22'-0'

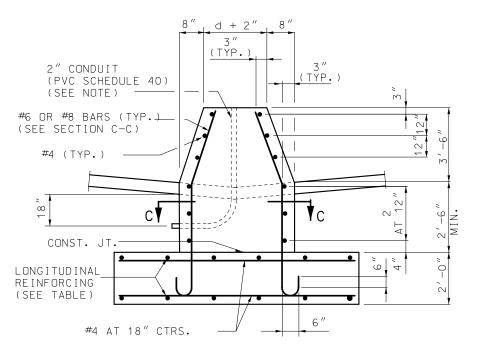
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF  $9\frac{1}{2}$ ".



SECTION C-C TYPICAL SECTION SHOWING REINFORCING STEEL

## DETAILS OF ALTERNATE PEDESTAL

(TO BE USED ADJACENT TO TYPE "A" OR "C" MEDIAN BARRIER)



PART ELEVATION (TYPE C CONCRETE TRAFFIC BARRIER)

#### GENERAL NOTES:

A TAPERED TUBE OF EQUILVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; A.S.T.M. SPECIFICATION

NO OBJECTIONABLE SEAMS WILL BE PERMITTED.

LONGITUDINAL

FOOTING

REINFORCEMENT

ВОТТОМ

7 - #6 BARS

9 - #6 BARS

9 - #7 BARS

10 - #8 BARS

10 - #8 BARS

11 - #8 BARS

11 - #9 BARS

TOP

7 - #5 BARS

8 - #5 BARS

9 - #5 BARS

10 - #5 BARS

10 - #5 BARS

11 - #5 BARS

11 - #5 BARS

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET NO. 4 OF 6 FOR DETAILS OF

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLF.

QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C MEDIAN BARRIER).

QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2'-0".

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.



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CONCRETE

MEDIAN

11.6

14.0

16.1

19.1

21.7

24.6

26.5

MEDIAN

10.9

13.2

15.2

18.1

20.6

23.3

25.1



## OVERHEAD SIGN TRUSSES

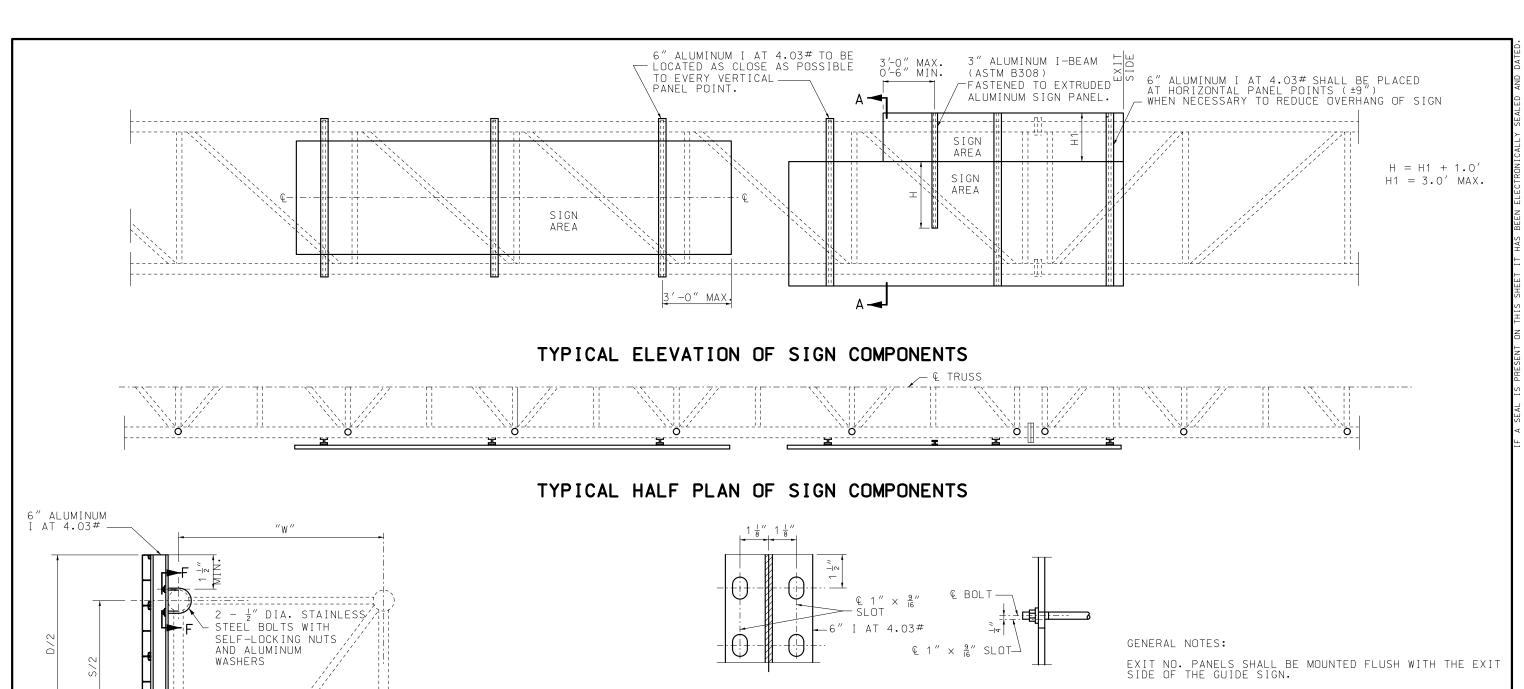
ALUMINUM

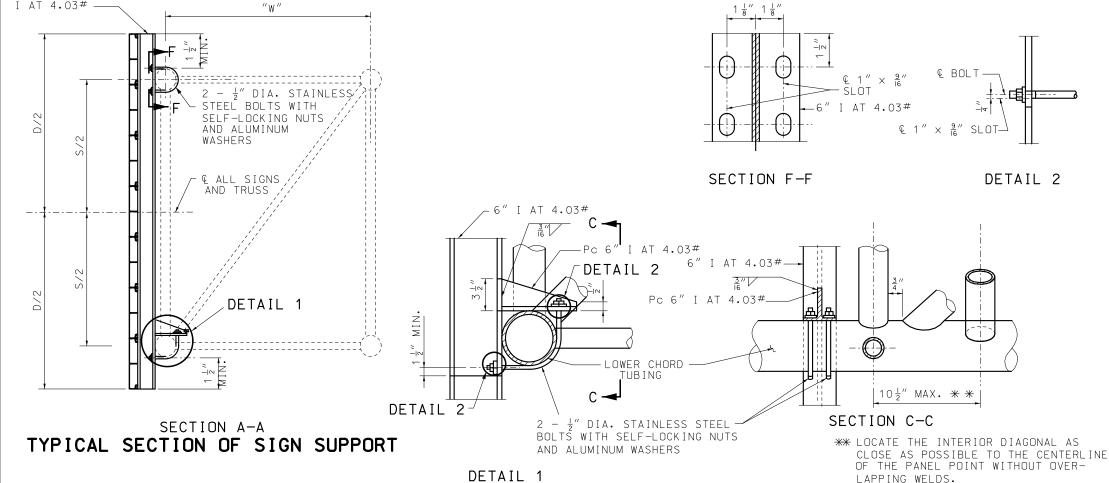
DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

10/14/2020

903.10BD

SHEET NO. 5 OF 6





ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL  $\ensuremath{\mathbb{Q}}$  OF THE TRUSS.

SEE STD. PLAN 903.09 FOR LIGHTING DETAILS IF LIGHTING THE SIGN IS NECESSARY.

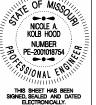
SEE STD. PLAN 903.03 FOR SIGN MOUNTING DETAILS.

ALL MATERIAL ALUMINUM EXCEPT AS NOTED.



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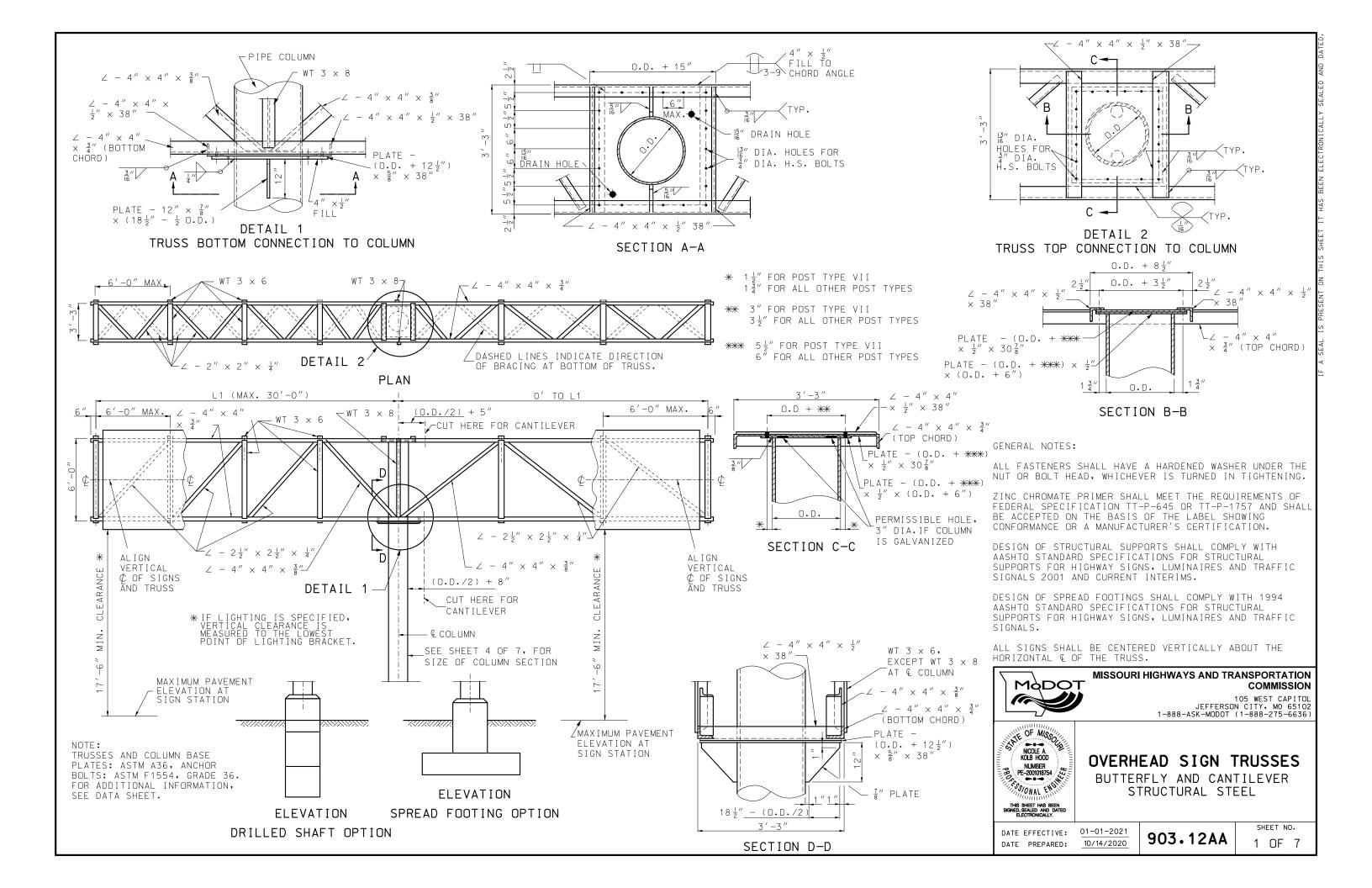
## OVERHEAD SIGN TRUSSES

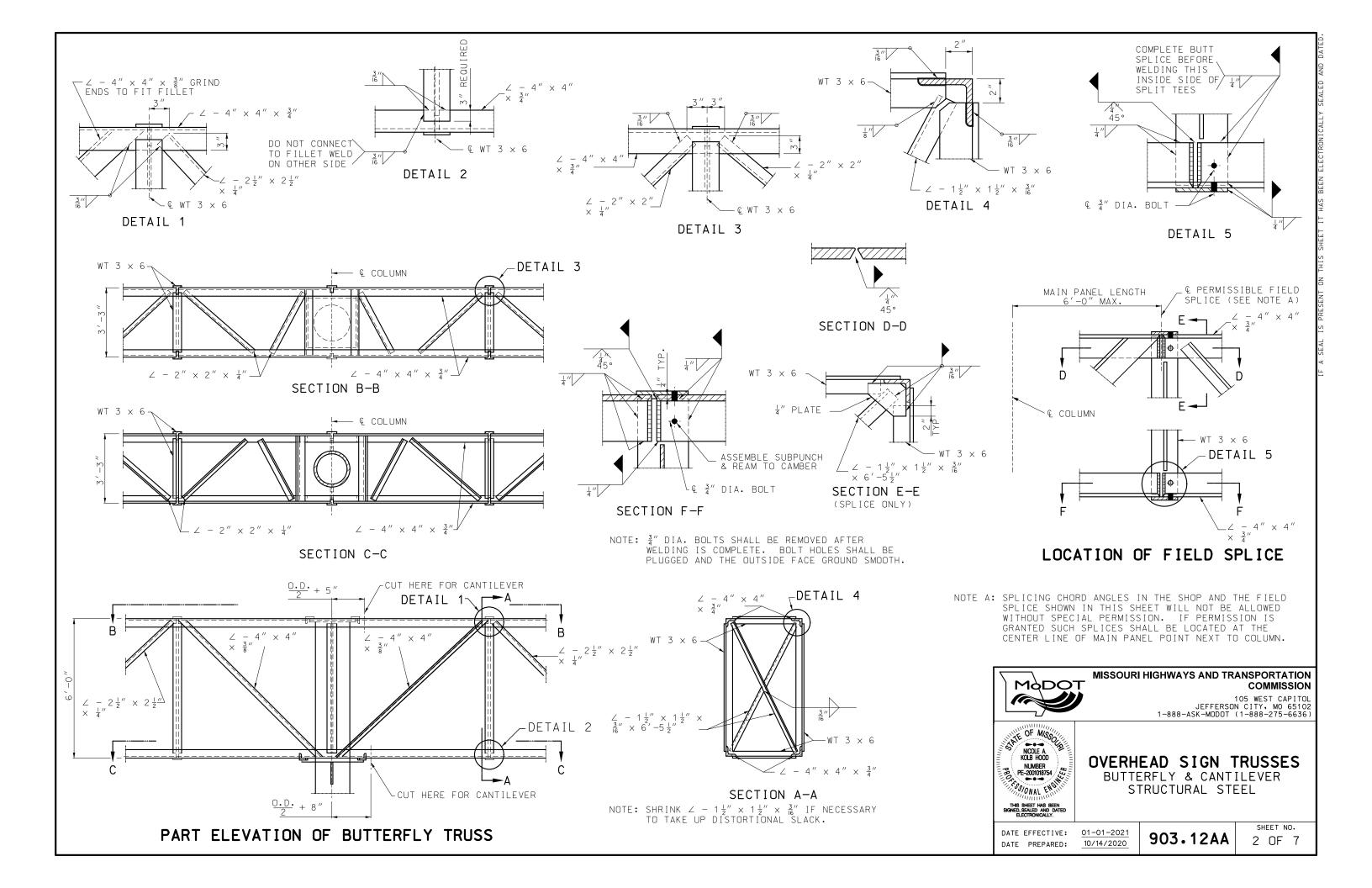
SIGN MOUNTING DETAIL

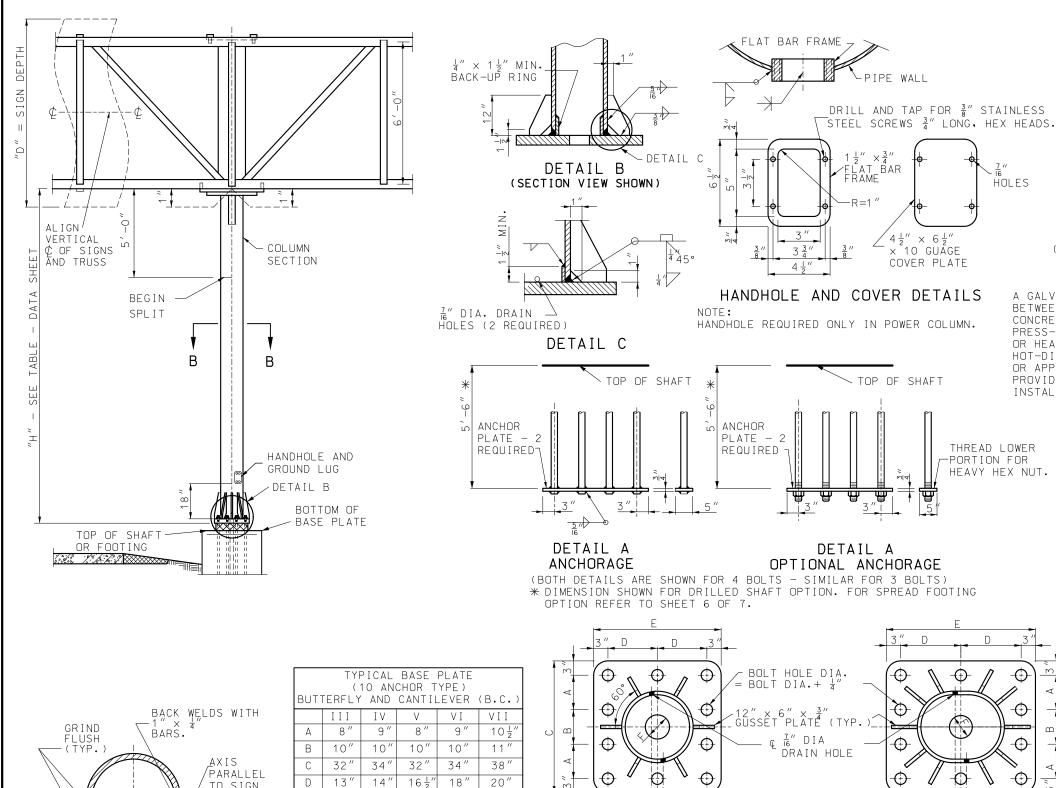
DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

903.10BD

SHEET NO. 6 OF 6







42" 46′ 1" RAD. (TYP) 6" 6 " -AXIS OF SIGN III AND IV B.C. V, VI, AND VII B.C. TYPICAL BASE PLATES

FOR DETAILS OF OPTIONAL SUBSTRUCTURES, SEE OTHER SHEETS.

34"

39"

6"

Ε

32 "

6"

ANCHOR BOLTS AND PLATE NOT SHOWN.

(1) ANCHOR BOLT EMBEDMENT SHALL BE AS SHOWN ON SHEET 6 OF 7. A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE, SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH. 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN (SEE TABLE) OR APPROVED EQUIVALENT. THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN PART ELEVATION

AXIS OF

SIGN

Ξ" DΙΑ. HOLE (FAR SIDE)

- 7/6" DIA. HOLE

(NEAR SIDE

GENERAL NOTES:

SUBSTRUCTURE SHALL BE BACKFILLED PRIOR TO ERECTION OF POST.

ASTM A 106 GRADE B STEEL PIPE OR A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53.

ALL STRUCTURES SHALL BE GROUNDED.

DRILL  $1\frac{1}{4}$ " DIA, HOLE.

FILLER PLATE THICKNESS

PIPE WALL THICKNESS

PLUG WELD AFTER

BENDING.

ANCHOR BOLT AS SPECIFIED

GALVANIZE ENTIRE LENGTH OF BOLT, HEAVY HEX NUTS,

AND ONE WASHER.

HOLES

INSTALLED.

THREAD LOWER

HEAVY HEX NUT.

 $\oplus$ 

⊕

**-**

⊕-

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<del>-</del>O+

-PORTION FOR

(SEE TABLE). THREAD UPPER PORTION, ("E" + 2"±).

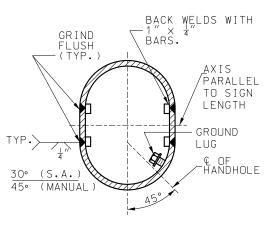
BURR THREADS ON ALL ANCHOR BOLTS.

A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL & OF THE TRUSS.





SECTION B-B (FOR SPLIT COLUMNS ONLY)

DRILLED SHAFT OPTION													ALTER	RNATE	PEDES	STALS
PIPE POST COLUMN TYPE O D WEIGHT "E" SPLIT BASE PLATE SIZE***  SIZE***  C FA FB	FC FD	FH	MOMENT		AR REINFORCEMEN SHEAR-C2					AR-S2	REBAR	CON- CRETE	1	REBAR TOTAL (LBS.)		RETE YDS.)
(LBS.)					SPACING	BARS	SPACING	S1 QUANTITY I	BARS	SPACING	(LBS.)	(CU.YDS.)				TYPE C
III $18''$ $93.45$ $8\frac{1}{2}''$ $0''$ $2'-8'' \times 2'-8'' \times 1\frac{3}{4}''$ $10$ $2''$ $2'-10''$ $4'-0''$ $7'-6'$	" 1 '-6" 4 '-6"	14′-0′	#6	6" #4	12"	#4	12"	19	#10 #5	6"	2126	12.4	2066	2077	13.4	14.5
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	5" 1'-6" 4'-6'	′ 14′-0′	#6	6" #4	12"	#4	12"	19	#10 #5	6"	2126	12.4	2066	2077	13.5	14.6
V   18"   93.45   $8\frac{1}{2}$ "   7"   3'-3" × 2' -8" × 2"   10   $2\frac{1}{4}$ "   2'-10"   5'-0"   13'-	6" 4'-0"  5'-6"	′  17′-0′	#6	6" #4	12"	#4	12"	22	#11 #6	6 "	3901	26.5	3763	3782	28.8	30.7
VI 20" 104.13 $8\frac{1}{2}$ " 8" $3'-6' \times 2'-10" \times 2\frac{1}{4}$ " 10 $2\frac{1}{4}$ " $3'-0"$ $5'-0"$ 14'-	0"4'-0" 6'-0"	′ 18 <i>′</i> –0′	#6	6" #4	12"	#4	12"	27	#11 #6	6"	4742	31.8	4528	4547	34.1	36.2
VII 24" 125.49 9" 8" $3'-10" \times 3'-2" \times 2\frac{1}{4}"$ 10 $2\frac{1}{2}"$ $3'-4"$ $5'-0"$ 14'-	0"4'-0"6'-0"	′ 18 <i>′</i> –0′	#6	6" #4	12"	#4	12"	27	#11 #6	6"	4742	31.8	4528	4547	34.5	36.8

	SPREAD FOOTING OPTION																			
POS1		PIPE COLUMN "F" SPLIT BASE PLATE		ANCHOR PEDESTAL BOLT SIZE **		FOOTING		I TUD I N E I NF Of		OT ING NT		PEDE E I NF OI	REBAR	CON- CRETE						
TYPE	O.D.	WEIGHT (LBS.)	E		SIZE <del>***</del>	NO.	DIA.	а	Ь	SIZE *	NO.	OP BARS	BOT NO.	TOM BARS	NO.	BARS	NO.	BARS	TOTAL (LBS.)	(CU.YDS.)
ΙΙΙ	18"	93.45	8 ½"	0"	$2'-8'' \times 2'-8'' \times 1\frac{3}{4}''$	" 10	2"	4'-2"	3 ′-8 ″	10′-0″ × 13′-0″	10	#5	10	#5	10	#4	14	#8	695	14.4
ΙV	20"	104.13	8 ½"	0"	2'-10" × 2'-10" × 2'	" 10	2 ¼"	4'-4"	3′-10″	10'-0' × 14'-0"	10	#5	10	#5	10	#4	14	#8	733	15.6
V	18"	93.45	8 ½"	7 "	3'-3" × 2'-8" × 2"	10	2 ¼"	4′-9″	3′-8″	9'-0" × 17'-0"	9	#5	10	#7	10	#4	14	#8	955	16.5
VΙ	20"	104.13	8 ½"	8 "	$3'-6' \times 2'-10'' \times 2\frac{1}{4}'$	10	2 ¼"	5′-0″	3′-10″	9'-0" × 19'-0"	9	#5	10	#7	10	#4	14	#8	1028	18.4
VII	24"	125.49	9"	8 "	$3'-10'' \times 3'-2'' \times 2\frac{1}{4}'$	10	$2\frac{1}{2}''$	5′-4″	4 '-2 "	10'-0" × 20'-0"	9	#5	12	#7	10	#4	14	#8	1196	21.5

	SPREAD FOOTING OPTION WITH ALTERNATE PEDESTALS																												
PO:		PIPE COLUMN D. WEIGHT	"E"	SPLIT	BASE PLATE SIZE <del>***</del>		ANCHOR PEDESTAL SIZE *		FOOTING SIZE *		E A LO ING RE	INFOR		REINFORCEMENT		TYPE A REBAR TOTAL	TYPE A CONCRETE	TYPE C LONGITUE				RCEMENT		TYPE ( REBAR TOTAL	TYPE C CONCRETE				
	_ 0.	(LBS.)				NO.D	IA. C	d	е	3122 //	NO.	BARS	NO.	BARS	NO.	BARS	NO.	BARS	_	(CU.YDS.)	NO.	BARS			NO. BARS	NO.	BARS	(LBS.	(CU.YDS.)
ΙI	I 18	8" 93.45	8 ½"	0"	2'-8" × 2'-8" × 1	$\frac{3}{4}''$ 10	2″2′–10	″ 6′-6″	15"	10′-0″ × 13′-0′	10	#5	10	#5	10	#4	14	#8	757	14.4	10	#4	10	#5	12 #4	14	#8	800	15.3
I,	V 20	0" 104.13	8 ½"	0"	2'-10" x 2'-10" x	2″ 10 2	3'-0	′ 6′-9″	18"	10'-0' × 14'-0'	10	#5	10	#5	10	#4	14	#8	795	15.6	10	#4	10	#5	12 #4	14	#8	839	16.5
٧	1 1 8	8″ 93.45	8 ½"	7 "	3'-3" × 2' -8" × 2	″ 10 2	<u>4</u> " 2'-10	″ 7′-0″	12"	9'-0" × 17'-0"	9	#5	10	#7	10	#4	14	#8	1015	16.5	10	#4	10	#7	12 #4	14	#8	1059	17.5
٧	I 20	0" 104.13	8 ½"	8 "	3'-6' x 2'-10" x 2	<u> </u> " 10 2	3'-0	7'-6"	15"	9'-0" × 19'-0"	9	#5	10	#7	10	#4	14	#8	1099	18.4	10	#4	10	#7	12 #4	14	#8	1134	19.5
VI	I 24	4" 125.49	9"	8 "	3'-10" × 3'-2" × 2	10 2	½" 3'-4	′ 7 <i>′</i> –10 <i>′</i> ′	15"	10'-0" × 20'-0'	7 9	#5	12	#7	10	#4	14	#8	1257	21.5	10	#4	12	#7	12 #4	14	#8	1302	22.6

\* BASE PLATES, PEDESTAL AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN. \*\* BASE PLATES, PEDESTAL AND FOUNDATIONS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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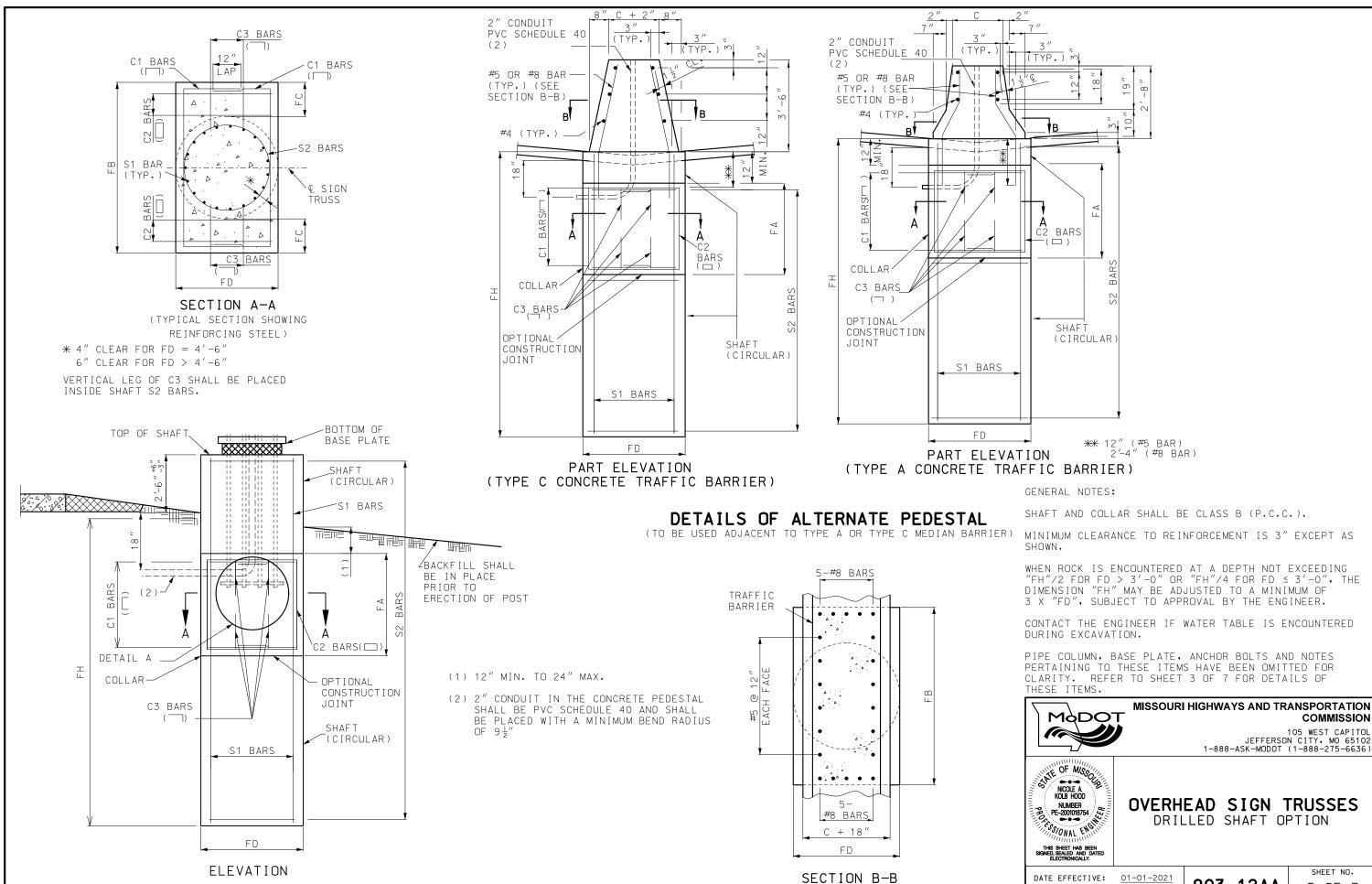


## OVERHEAD SIGN TRUSSES OPTIONAL SUBSTRUCTURE DATA

DATE EFFECTIVE: 01-01-2021 DATE PREPARED: 10/14/2020

903.12AA

SHEET NO. 4 OF 7

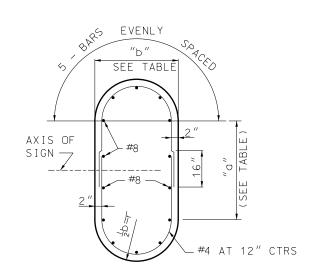


903.12AA

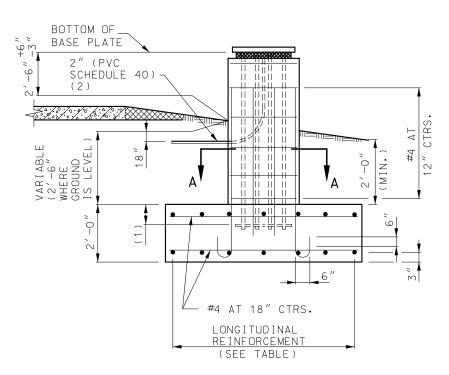
DATE PREPARED:

10/14/2020

5 OF 7

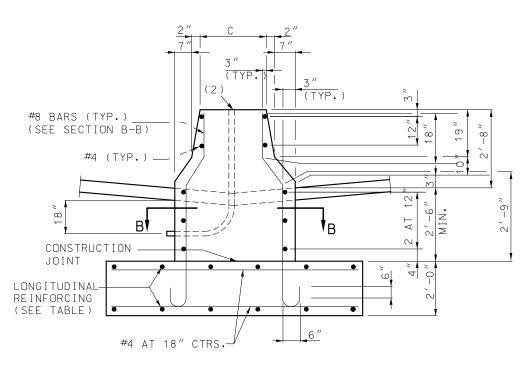


SECTION A-A (TYPICAL SECTION SHOWING REINFORCING STEEL)

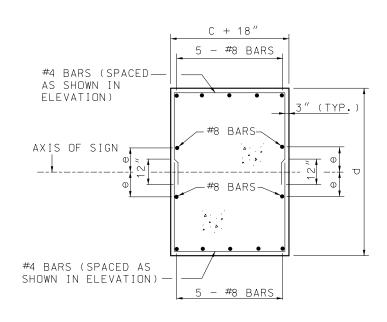


**ELEVATION** 

- (1)  $12^{"+6"}_{-3"}$  (DETAIL FOR 12" FIELD TOLERANCE)
- (2) 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINUMUM BEND RADIUS OF  $9\frac{1}{2}$ ".

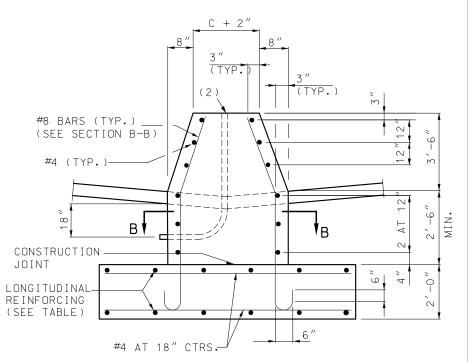


PART ELEVATION (TYPE A CONCRETE TRAFFIC BARRIER)



SECTION B-B TYPICAL SECTION SHOWING REINFORCING STEEL

DETAILS OF ALTERNATE PEDESTAL



PART ELEVATION (TYPE C CONCRETE TRAFFIC BARRIER)

GENERAL NOTES:

PEDESTAL AND FOOTING SHALL BE CLASS B (P.C.C.).

MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PETAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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## OVERHEAD SIGN TRUSSES

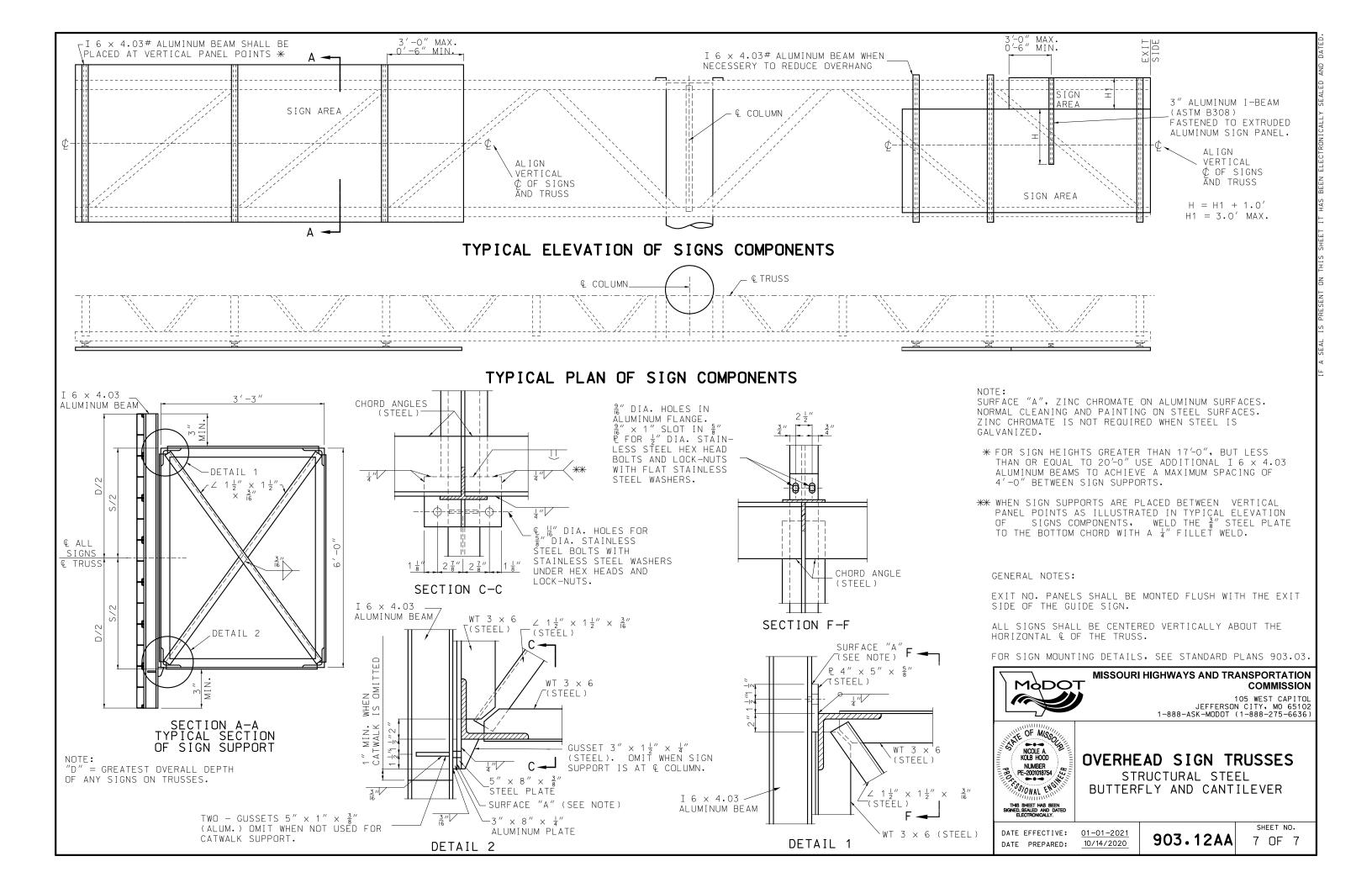
SPREAD FOOTING

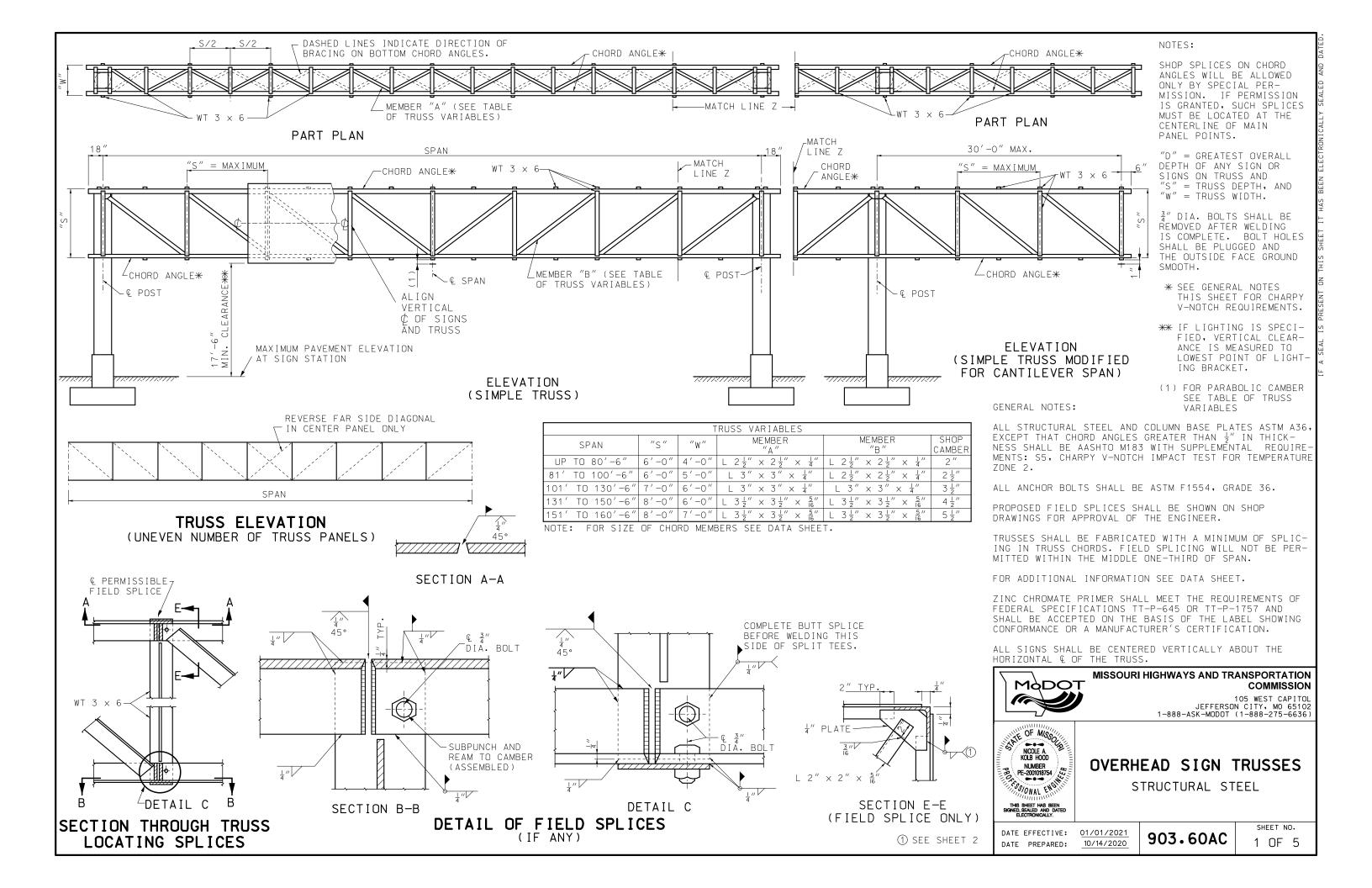
DATE PREPARED:

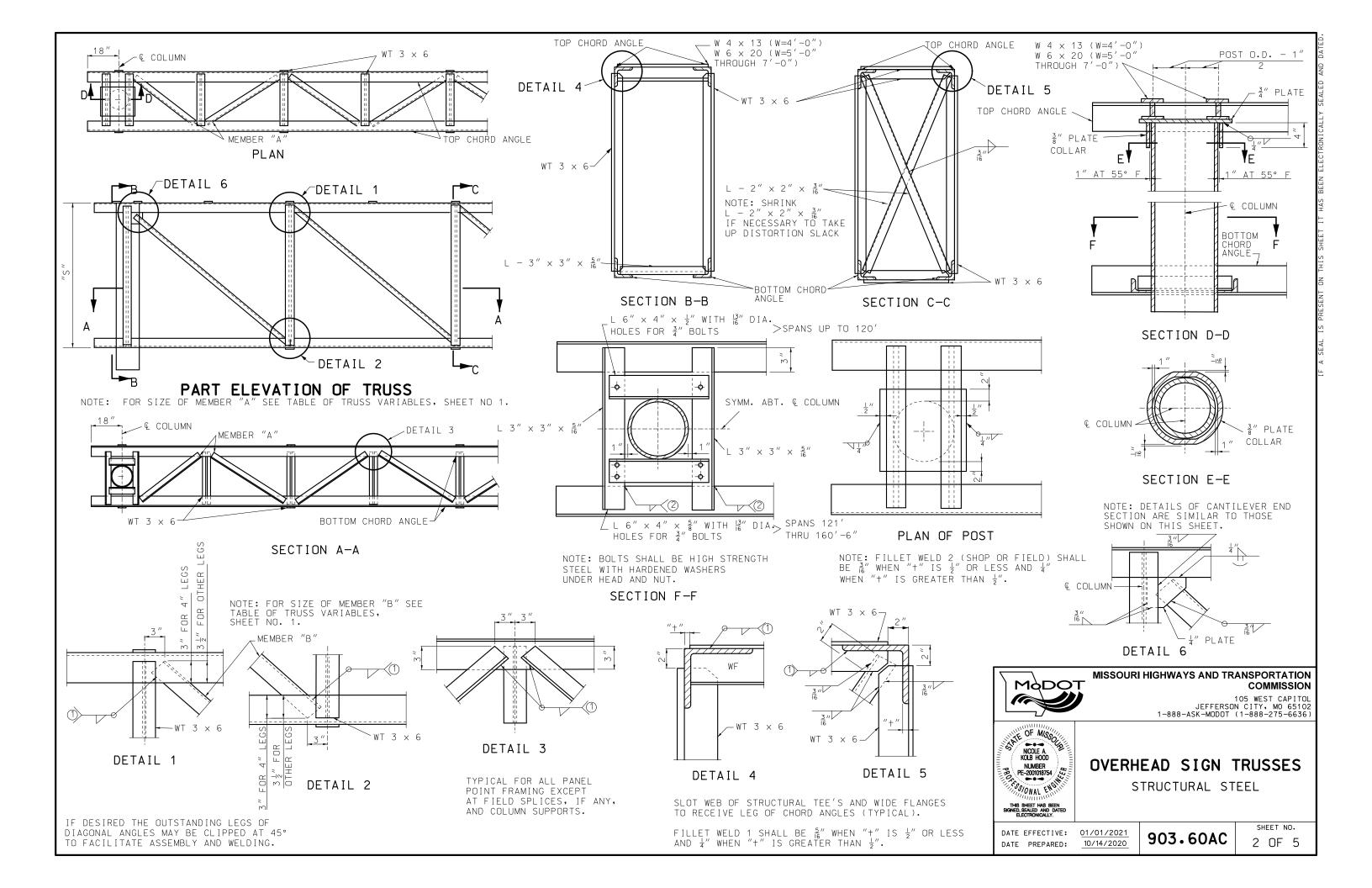
DATE EFFECTIVE: 01-01-2021 10/14/2020

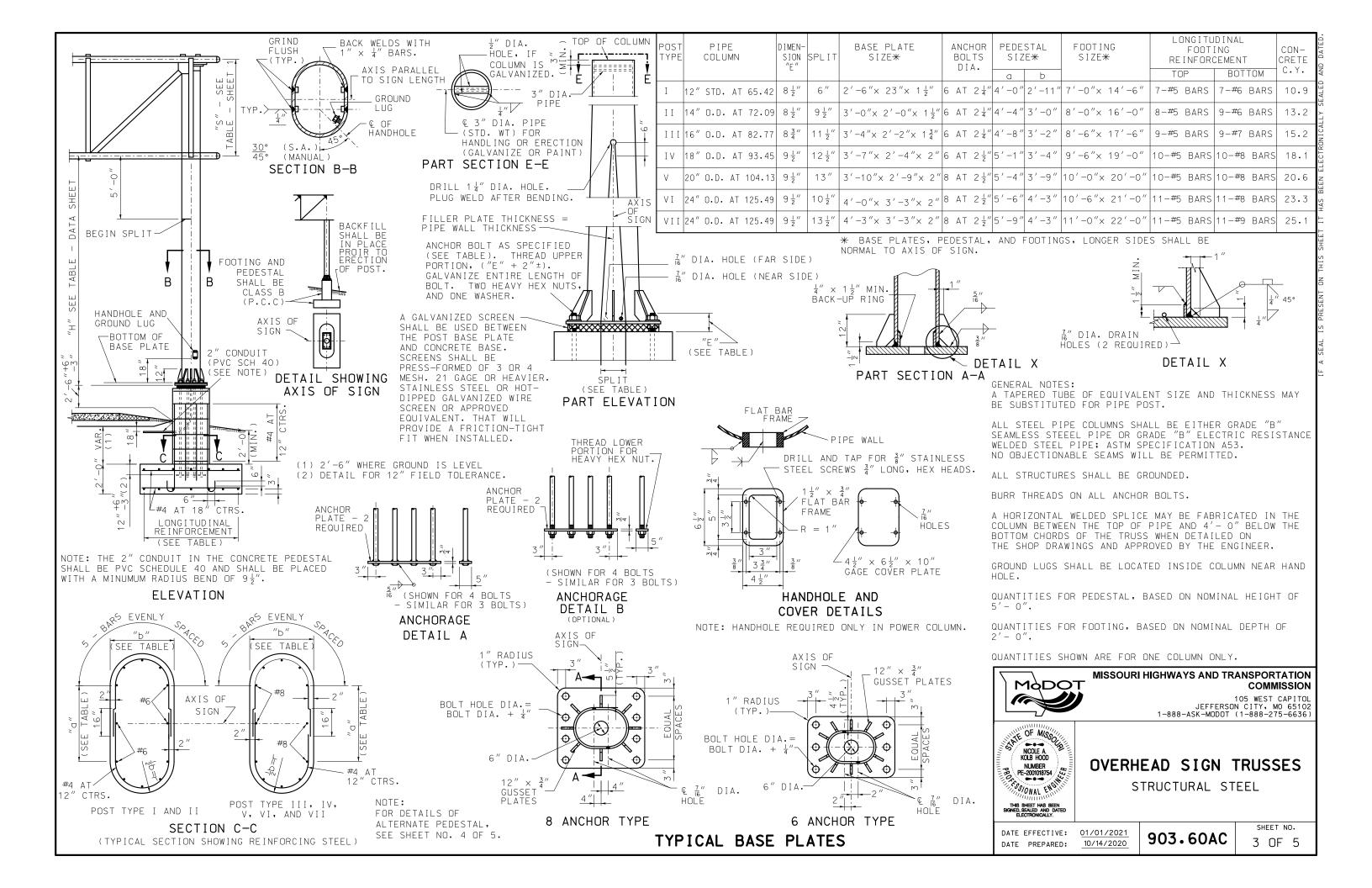
903.12AA

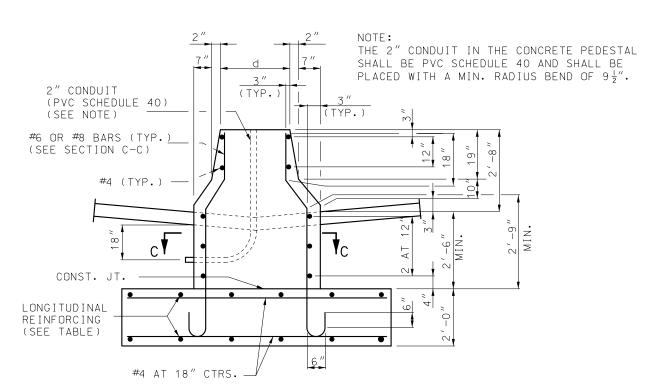
SHEET NO. 6 OF 7







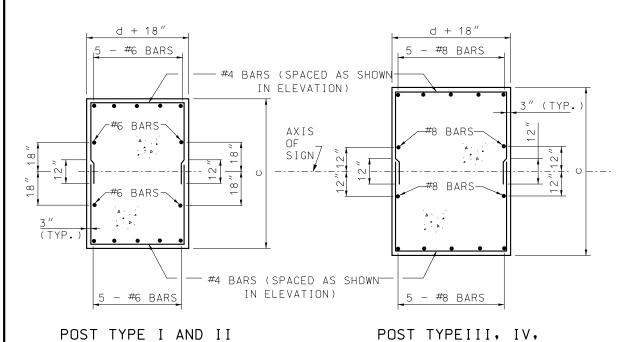




CONCRETE LONGITUDINAL **PEDESTAL** C.Y. FOOTING POST PIPE FOOTING SIZE<del>\*</del> REINFORCEMENT TYPF COLUMN SIZE\* MEDIAN MEDIAN С d TOP ВОТТОМ BARRIER BARRIER 12" STD. AT 65.42 7-#5 BARS 5'-9' 2'-1" 7'-0"× 14'-6" 7-#6 BARS 10.9 11.6 6'-2 2'-2" 8'-0"x 16'-0" 13.2 14" O.D. AT 72.09 8-#5 BARS 9-#6 BARS 14.0 16" O.D. AT 82.77 2'-4" 8'-6"x 17'-6" 9-#5 BARS 9-#7 BARS ΙΙΙ 15.2 16.1 18" O.D. AT 93.45 10-#5 BARS 10-#8 BARS ΙV 2'-6" 9'-6"x 19'-0" 18.1 19.1 2'-11 20" O.D. AT 104.13 7′-8 10'-0"x 20'-0' 10-#5 BARS 10-#8 BARS 20.6 21.7 VΙ 24" O.D. AT 125.49 8'-3 3'-5" 10'-6"x 21'-0" 11-#5 BARS 11-#8 BARS 23.3 24.6 24" O.D. AT 125.49 8'-6 3'-5" 11'-0"x 22'-0" 11-#5 BARS 11-#9 BARS 25.1 26.5

\* BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.

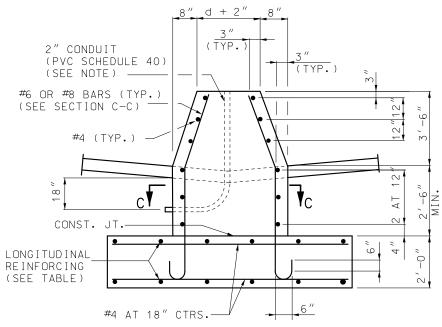
## PART ELEVATION (TYPE A CONCRETE TRAFFIC BARRIER)



V, VI, AND VII

SECTION C-C TYPICAL SECTION SHOWING REINFORCING STEEL

#### NOTE: THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MIN. RADIUS BEND OF $9\frac{1}{2}$ ".



PART ELEVATION (TYPE C CONCRETE TRAFFIC BARRIER)

### GENERAL NOTES:

A TAPERED TUBE OF EQUILVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; ASTM SPECIFICATION A53.

NO OBJECTIONABLE SEAMS WILL BE PERMITTED.

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY, REFER TO SHEET 3 OF 5 FOR DETAILS OF THESE ITEMS.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

QUANTITIES FOR PEDESTAL ARE BASED ON NOMINAL HEIGHT OF 5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C MEDIAN BARRIER).

QUANTITIES FOR FOOTING ARE BASED ON NOMINAL DEPTH OF 2'-0".

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.



#### MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)



## OVERHEAD SIGN TRUSSES

STRUCTURAL STEEL

DATE EFFECTIVE: 01/01/2021 DATE PREPARED:

10/14/2020

903.60AC

SHEET NO. 4 OF 5

## DETAILS OF ALTERNATE PEDESTAL

(TO BE USED ADJACENT TO TYPE "A" OR "C" MEDIAN BARRIER)

